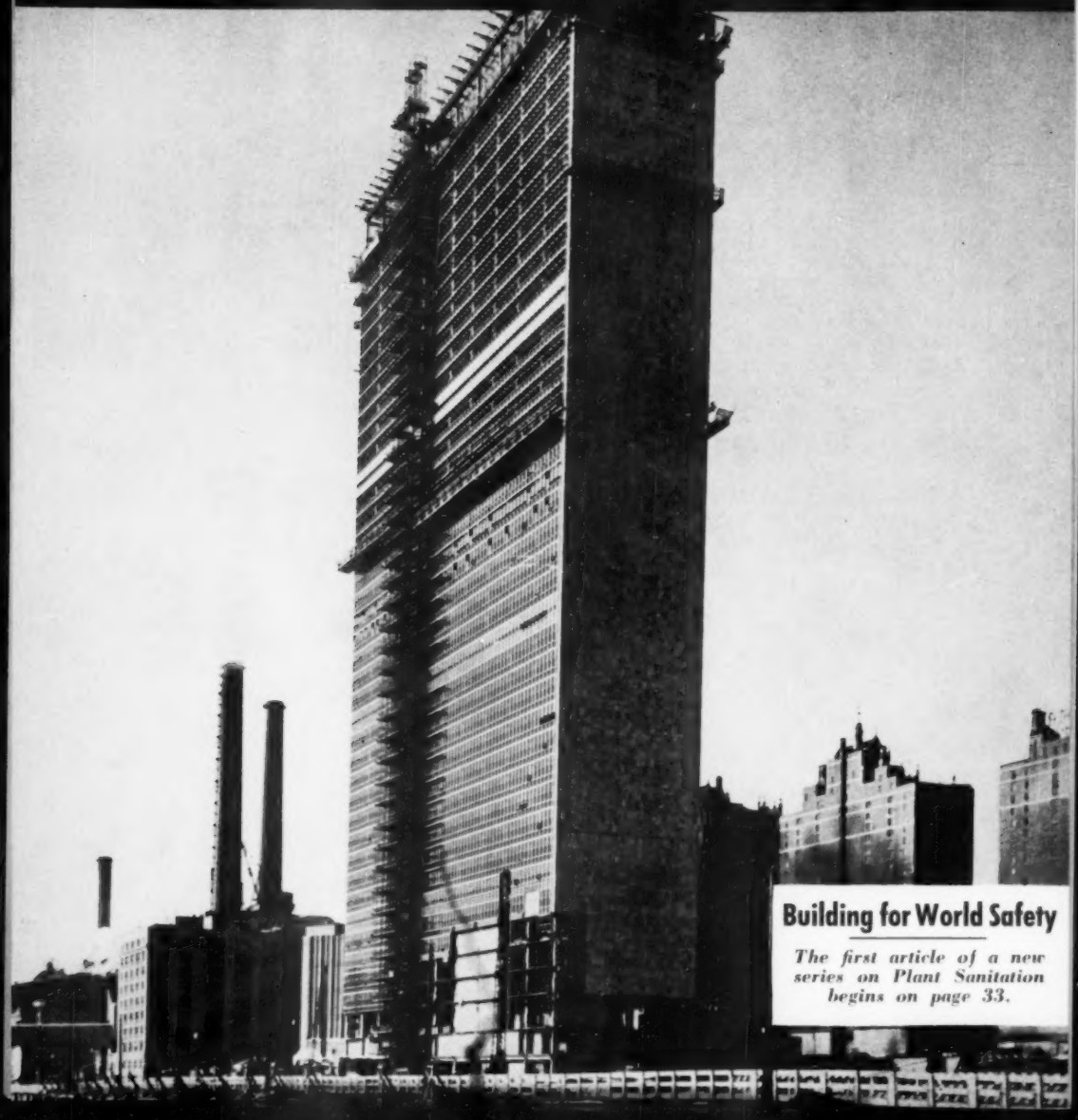
SAFETY ENGINEERING



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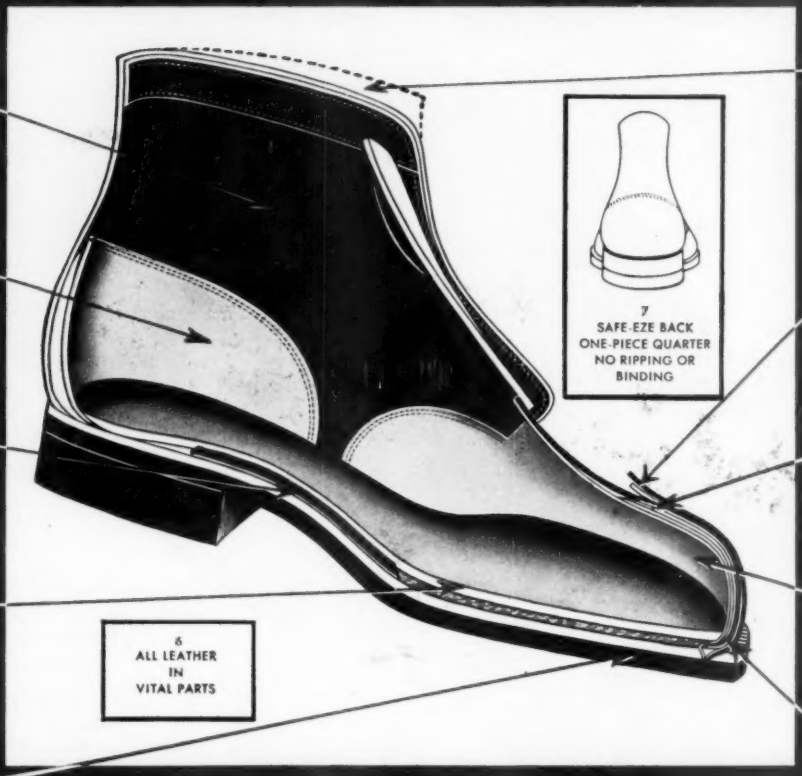
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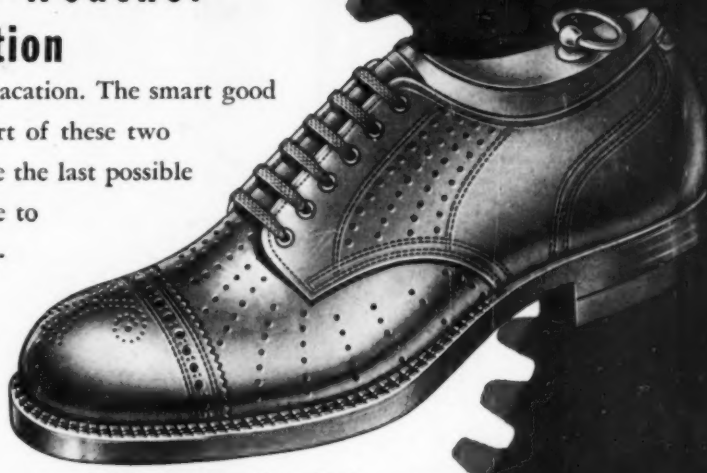

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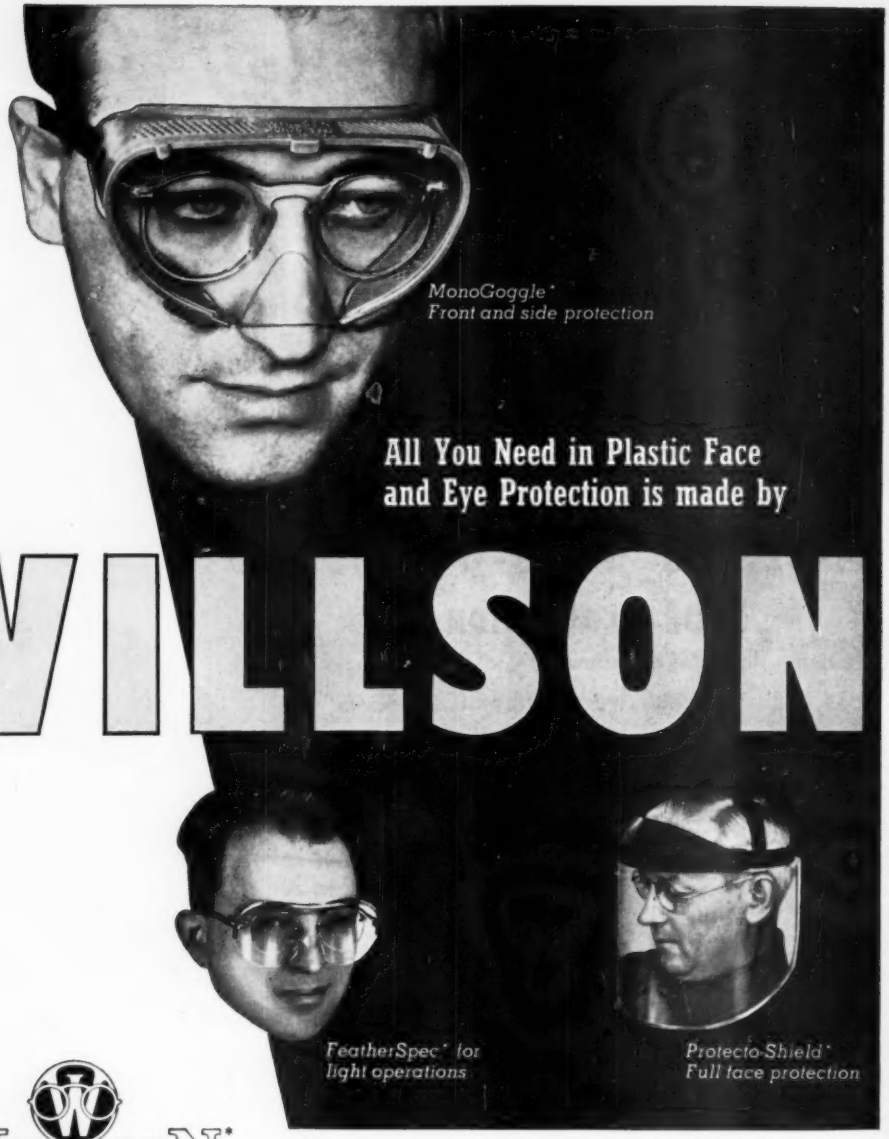

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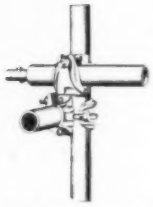

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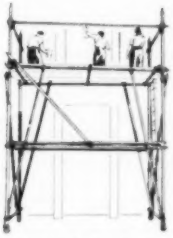

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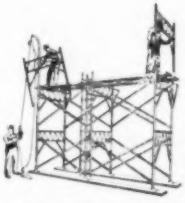

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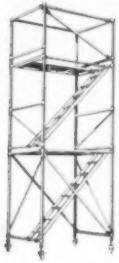
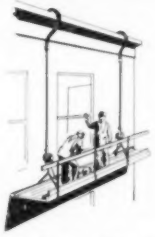


• Aluminum Rolling Scaffolds



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The Magazine of Safety

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A MONTHLY PUBLICATION DEDICATED TO ACCIDENT PREVENTION, HEALTH CONSERVATION AND FIRE CONTROL.
EST. 1901

VOLUME 99, NO. 3 **MARCH, 1950**

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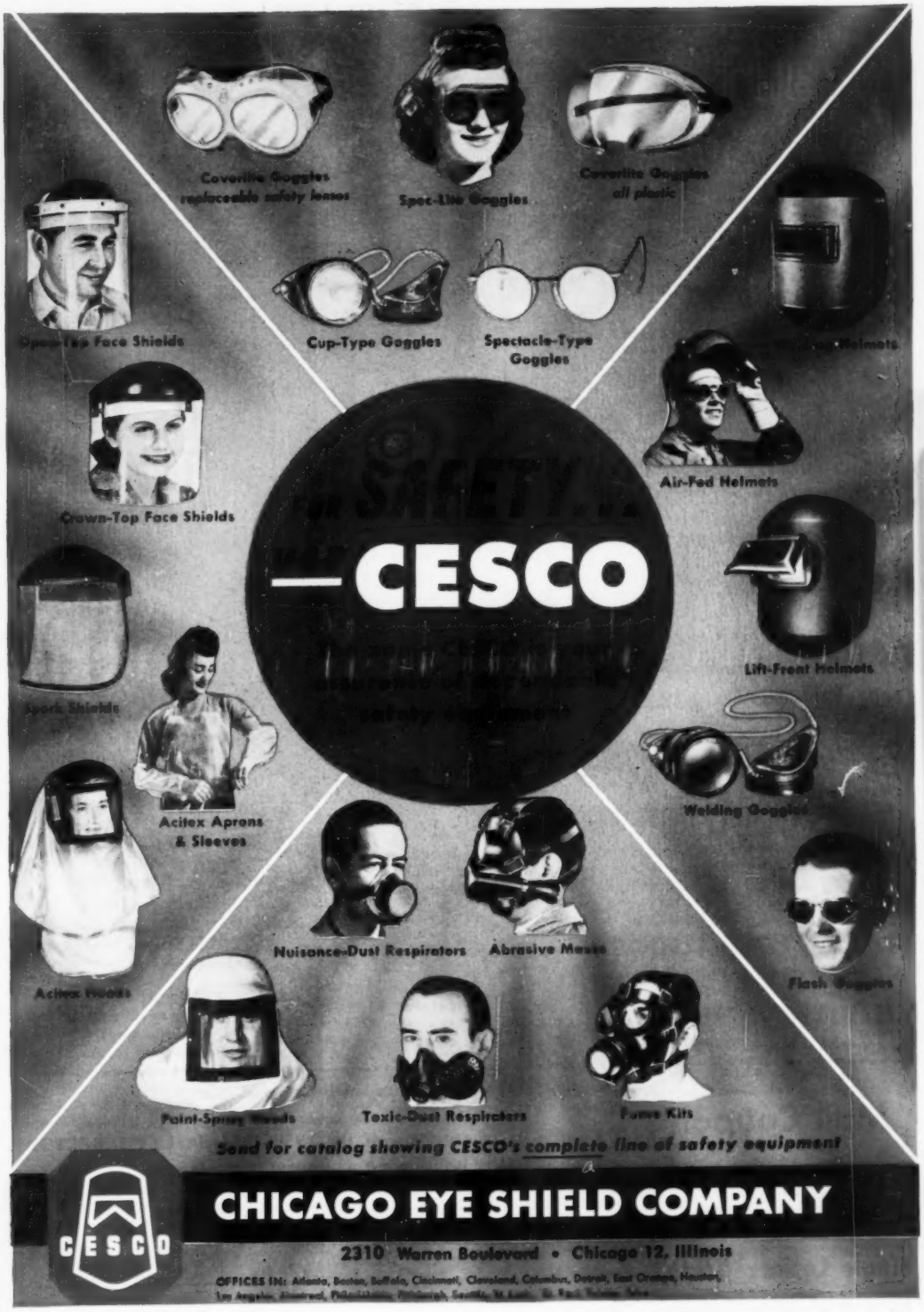
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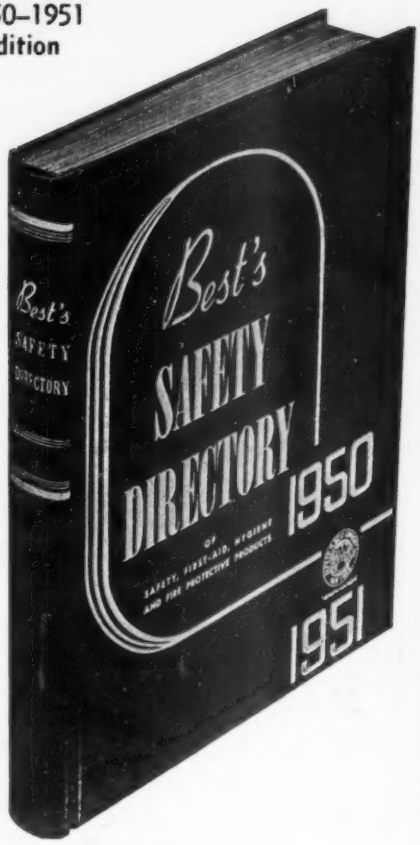

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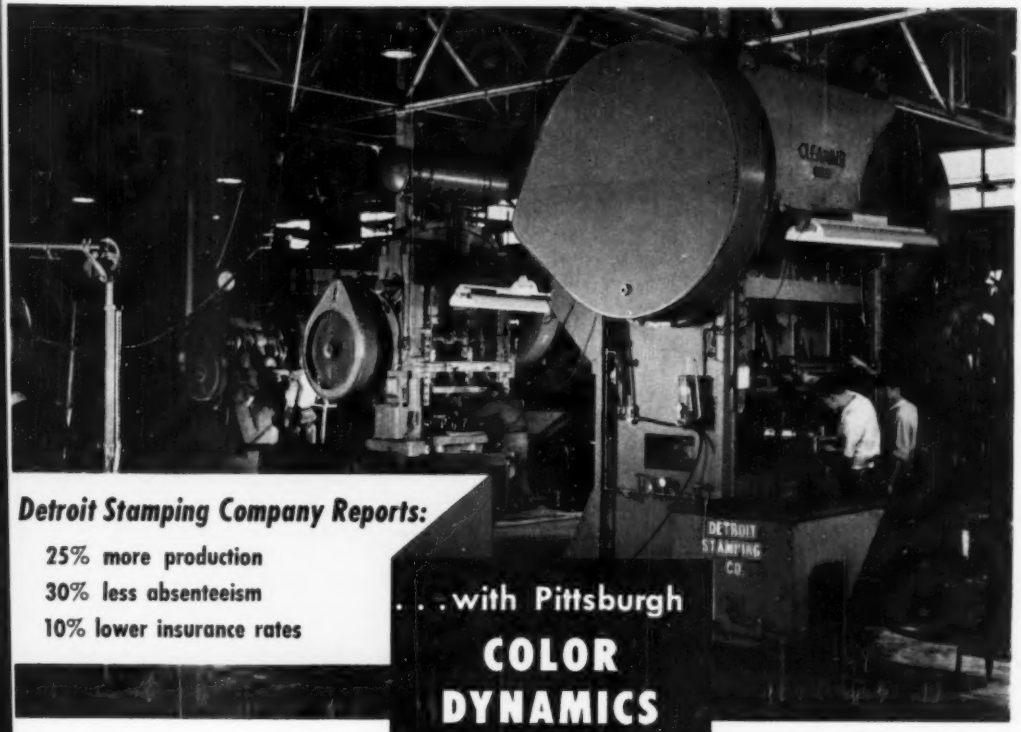

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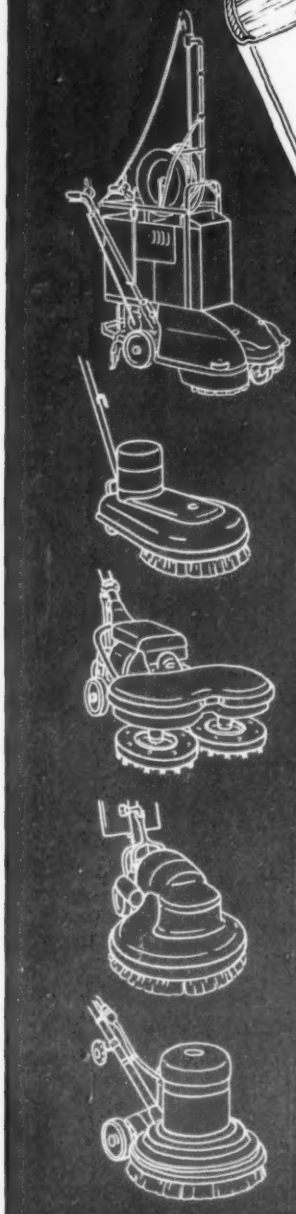

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★ FALSE ECONOMY

NO MORE tragic example of mismanagement can be found in all lines of business than a policy of false economy which in itself can be another name for gross extravagance. True, it is difficult always to know the difference between true and false economies and when it is safe to cut corners in order to effect genuine savings. We may know that they are necessary in our personal and business life but only good judgment must prevail in determining actual savings.

Now that a competitive market is confronting us once again, there is a growing tendency to cut out the frills that were possible when buyers came pleading for our wares. This awareness is as it should be. Nevertheless, we can never concede that effort toward saving life and property can be characterized as a "frill."

Time was when it was quite the usual order for plants to close down the safety department and abandon all safety activities when business slackened a bit. Moreover, it was a foregone conclusion that requisitions for necessary safety equipment would be looked upon with jaundiced eye despite the proven fact that the cost of just one accident was more than offset by the price of the safeguard. Happily, this archaic line of reasoning is not the general rule today. Management has had ample proof that the investment of a dozen pairs of goggles, an approved fire extinguisher; a dust control unit, a first-aid kit; a clean, sanitary washroom; safety helmet or shoes; protective clothing—all these and more can ultimately cost *nothing at all* when properly evaluated.

It must be remembered that the many costs of an accident do not go down automatically the moment incoming orders stop breaking records. On the contrary, as is so often the case, the cost of a serious accident becomes even more burdensome at such a time.

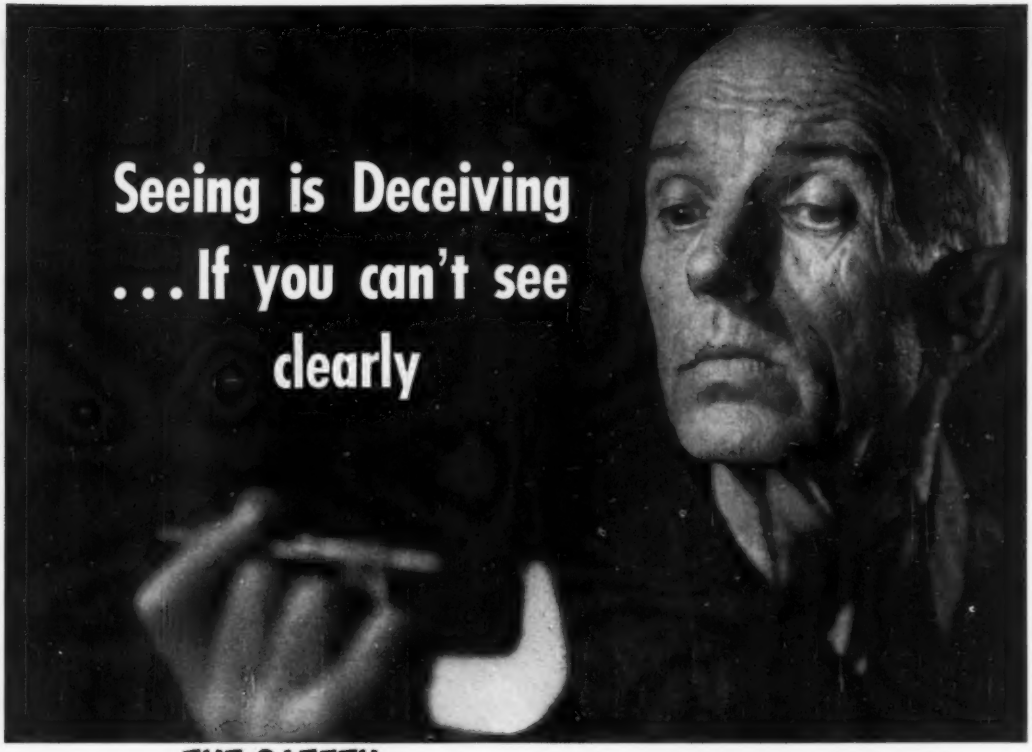
It is here that we have a classic example of false economy. Reduction in the staff devoting its energies to accident prevention and blue-penciling orders for protective equipment then becomes a luxury few organizations can afford.

Were this writer a safety director or a plant supervisor charged with the grave responsibility for preventing accidents, a strong argument in true vs. false economy would be started whenever the wrong corner appeared in danger of being cut. Net profits too can be cut, and drastically, whenever ill-advised cuts are made in the direction of safety. H.A.

NEW PUBLICATION DATE

Effective with the April, 1950 issue,

***SAFETY ENGINEERING* will be published on the 1st instead of the 15th of each month**



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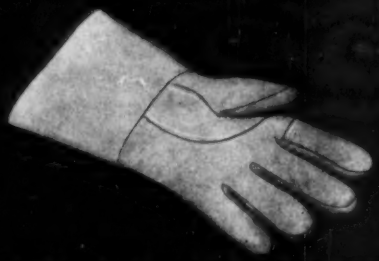

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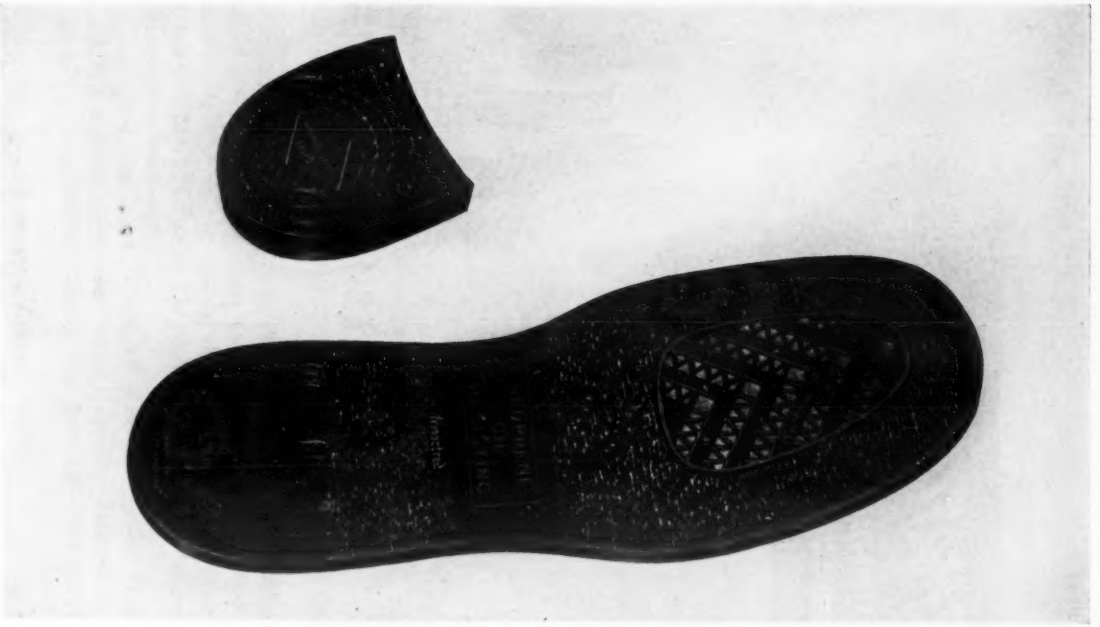

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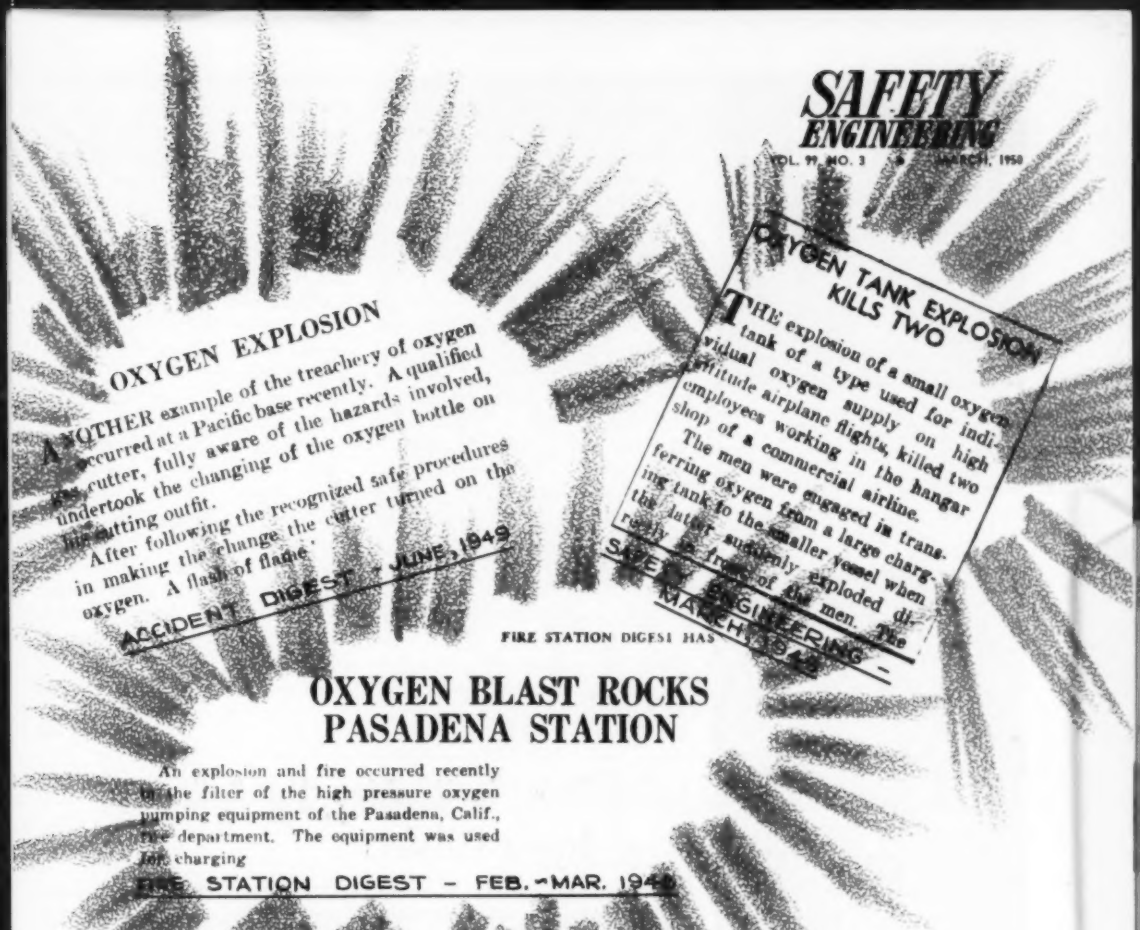

SAFETY ENGINEERING
VOL. 99, NO. 3 MARCH, 1950
OXYGEN TANK EXPLOSION KILLS TWO
THE explosion of a small oxygen tank of a type used for individual oxygen supply on high altitude airplane flights, killed two employees working in the hangar shop of a commercial airline.
The men were engaged in transferring oxygen from a large charging tank to the smaller vessel when the latter suddenly exploded directly in front of the men. The
SAFETY ENGINEERING - MARCH 1950
OXYGEN EXPLOSION
ANOTHER example of the treachery of oxygen occurred at a Pacific base recently. A qualified gas cutter, fully aware of the hazards involved, undertook the changing of the oxygen bottle on his cutting outfit.
After following the recognized safe procedures in making the change the cutter turned on the oxygen. A flash of flame
ACCIDENT DIGEST - JUNE, 1949
FIRE STATION DIGEST HAS
OXYGEN BLAST ROCKS PASADENA STATION
An explosion and fire occurred recently in the filter of the high pressure oxygen pumping equipment of the Pasadena, Calif., fire department. The equipment was used for charging
FIRE STATION DIGEST - FEB.-MAR. 1949

TREAT OXYGEN WITH RESPECT!

BY ARTHUR E. MILLER, Design Engineer,
Scott Aviation Corporation, Lancaster, N. Y.

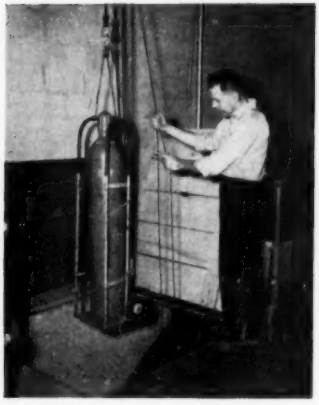
What is dangerous about cylinders of oxygen? Plenty! Know the proper techniques for handling and using them.

ONE hundred and seventy-five years ago Joseph Priestley, an English scientist, discovered oxygen and recognized it as a new element. In the intervening time there has been continued research which has led to a better understanding of the vital part oxygen plays in our lives and to finding not only better methods of producing and more ways of using oxygen, but also safer methods of handling it.

In industry there has been a steady increase in the demand for compressed gaseous oxygen. The most common commercial use is probably in cutting and welding of metals, but there are many other industrial processes where large quantities of oxygen are used.

In the field of medicine the use of oxygen is becoming more and more commonplace. Not too many years ago oxygen was administered to patients only as a last resort, and the number of recoveries was so small that the placing of a patient in an oxygen tent was a tacit warning to the next of kin to prepare for the worst. Now, oxygen, either in pure form or combined with helium or carbon dioxide, is used by doctors and rescue crews in resuscitators and inhalators for reviving victims of drowning, electric shock, asphyxiation, cardiac failure, or bronchial insufficiency. It is also used by many people in their own homes and by physicians in their offices for inhalations of penicillin and for periodic administrations of oxygen

A special truck or dolly should be used for transplanting oxygen cylinders around the plant. Note that the cylinder is secured in the dolly by two chains. The rubber-tires, anti-friction bearing wheels make for smooth, easy movement. When stationary, the two wheels combine with the flat bottom to form a large stable base for unit.



The special truck or dolly is also used for the hoisting of cylinders to and from the basement storage area. Note that welded steel hooks (not ropes) are used for attaching the dolly. The reason for the form of the side members of the dolly is apparent in this picture: for safety in hoisting.

For transporting cylinders to and from the upper floors of the plant, the carrying clamps are used. These provide a firm, self-locking grip, permitting the cylinders to be carried up and down stairs with complete ease and safety.

to relieve asthma, bronchitis, and other bronchial disorders. It has been used successfully in the relief of migraine, in treating abdominal distension, in clearing up ulcerated or burned tissues, even in curing hangovers!

Oxygen has also been found very useful in aviation. It was recognized early in the history of aviation that man's ability to fly to any considerable altitude was limited by the ability of his body to continue, in rarefied air, the process of "vital combustion" which keeps us alive. The solution adopted and still in wide use is to equip aviators and passengers with either portable or stationary breathing equipment which would supply them either with sufficient pure oxygen to "enrich" the rarefied air, or at altitudes above 30,000 ft. to furnish them with 100% pure oxygen. As planes have grown larger, cabin pressurizing has been introduced. This means that the cabin air is sealed off from the atmosphere surrounding it, and an air pressure is maintained in the cabin which is equal to that at 8000 ft. or less, regardless of the altitude at which the plane is flying. It was at first believed that this would make oxygen equipment entirely unnecessary, but time and experience have proved that some oxygen equipment is still necessary for emergency use in the event of failure of the cabin pressurization system, for relief of air sickness, and for the physiological and psychological relief of passengers who have a known respiratory or cardiac condition.

For these reasons, and many others, which need not be discussed here, the production, transportation, storage, and handling of oxygen have become quite common, and the average individual accepts the fact that oxygen is useful. However, the "average individual" and even the people who handle, transport, store, and use oxygen are not always conscious of the fact that oxygen, *(To page 62)*

Safety Rules in Handling, Use & Storage of Oxygen Cylinders

1—Use only cylinders carrying I.C.C. markings. Do not improvise cylinders by using air-tanks or water-tanks, pipe, or other containers.

2—Do not charge cylinders to pressures in excess of the service pressure stamped or otherwise shown on the cylinders.

3—Do not tamper with cylinders. Do not attempt to repair valves unless cylinder is empty and you are equipped for and experienced at such repairs. Do not weld, braze, or solder leaking, cracked or dented cylinders. Do not use cylinders which have been exposed to fire.

4—Store cylinders in a cool, dry place. Fasten cylinders to prevent falling.

5—In handling, do not knock cylinders over, or allow them to fall. Do not use valve cover-cap as a handle for carrying or hoisting.

6—Do not abuse cylinders by using them as rollers, anvils, etc.

7—Keep cylinder valves closed when not in use, or when cylinder is empty. Be sure cylinder valve connection is clean before attaching regulator.

8—Do not use oil, grease, or paint on cylinder valves, regulators, or connections. Do not handle valves, regulators, or connections with oily hands, gloves, or rags.

9—Always use a pressure reducing regulator; never connect a line directly to the cylinder valve. Open the cylinder valve very slowly.

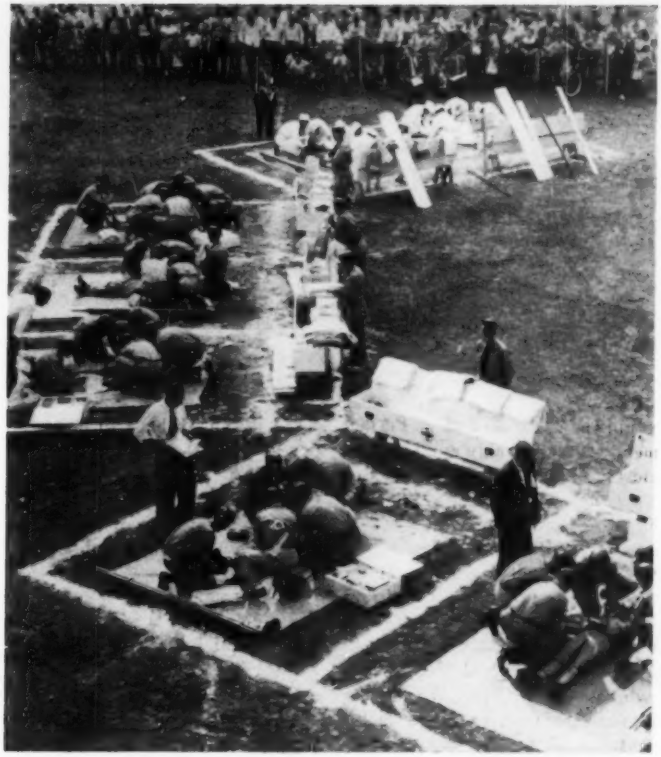
10—Do not use oxygen as a substitute for compressed air. Oxygen is extremely dangerous in many uses where air is perfectly safe.

11—Always treat oxygen with respect! Properly used it can be useful and beneficial, but used improperly it is potentially harmful and destructive.

For more detailed suggestions and hints on the safe handling of oxygen and other commercial compressed gases, obtain a copy of "Precautions and Safe Practices" from Linde Air Products Co. and "Safe Practices in Handling Compressed Gases" from the National Safety Council.

FEATURE

This is the third of three feature articles on First Aid. The first two articles, dealing with resuscitation and first aid equipment, appeared respectively in the January and February issues of SAFETY ENGINEERING.



A typical first-aid contest being held at Omar, West Virginia. All the rival teams of bituminous coal miners are engaged on a problem to be finished within a specified time. The problems are so designed that each team member works continuously.

By J. J. PLASKY,
Director of Training & Safety
Red Jacket Coal Corporation
Red Jacket, W. Va.

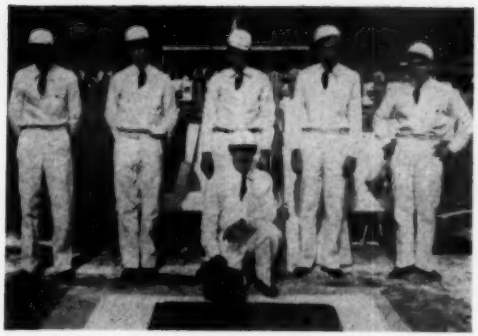
First Aid Training in Coal Mining

In few industries is a knowledge of first aid more vital than in mining. Here are some of the problems, accomplishments, and benefits of first aid training in coal mining operations.

WATCH a good football game and observe in superior teamplay the expertly disciplined players who are thoroughly skilled in the fundamentals of blocking and tackling, along with a precise coordination of timing. It is the same with operational safety, which requires thorough inculcation of the *fundamentals* of team-work. First-aid training is elementary to safety educational endeavor, as well as in the actual rescue work during emergency. First-aid training helps to imbue a man's mind with those conditioned mental reflexes, of such value in times of crisis, which are elementary in safety-consciousness. In all industry there is a pressing need for more first-aid instruction utilizing modern training aids such as movies.

In bituminous coal mining we have learned that safety-conscious working procedure is inseparable from efficiency of production. Good operational safety reflects an efficient management and enhances profitability, because accidents are costly. First aid comes first in training the miner to do his job carefully and efficiently in the underground mass production factory which is the modern bituminous coal mine.

Obviously bituminous mining involves hazards singular to the business, especially at the underground working "face" where the coal is extracted from its natural bed by complex machines which cut, load, shuttle and haul the coal in great bulk out of the mine. Consider that the bituminous coal industry has a



A first-aid team of the Red Jacket Coal Corp. This group represents company's bituminous coal mine at Wyoming, West Virginia, in contests.

The first-aid and safety training building, provided by the Red Jacket Coal Corp., has assembly, work, and storage rooms and a garage.

mining labor force of about 435,000 men. It has probably applied first-aid training on a more widespread basis than has any other industry, and at one time or another nearly every man has been reached in this educational endeavor. Down through the years the bituminous industry's safety record has been consistently improving, and 1949 achieved a new record which supersedes that of 1948. We believe first-aid training is a major factor contributing to this improvement.

First Aid Is a Step to Safety

There are reasons why first aid has had widespread application in bituminous coal. It is the first and elementary step toward inculcating safety-consciousness into workmen's thinking, and secondly, the occurrence of accidents are often distantly underground, and an injured man may have to be transported a matter of miles before getting a physician's attention. Considering this latter point, it is almost mandatory that all men be trained in what to do and when to do it.

In bituminous coal mining this first-aid training is an endeavor of the Federal Bureau of Mines, the States' Departments of Mines, the coal companies and the miners. The U. S. Bureau of Mines was the pioneering agency. In addition State departments of mines have always lent their assistance and recently have been increasing their personnel and scope, but their means are limited and their functions largely confined to inspections. Coal company managements have done a lot. The miners individually in the past have cooperated, their union is doing more today, and a great deal more is expected of them.

The labor union exerts a potent influence throughout its big membership; and while operational safety may be considered the management's responsibility, it takes *both* labor force and management to make safety succeed. There are instances where the labor union has asked for, and in general receives, the cooperation of managements; but sometimes the participation of the rank and file of miners is not what it should be. The union could help by getting its member miners to participate in first-aid training and its accompaniments. More positive cooperation could clarify much confusion.

Pay for first-aid training off-time is a consideration. Some miners want to be paid for it, but this seems inconsistent with the coal miners' temperament. He is inured to working amidst *(To page 44)*

Employees of the Red Jacket Coal Corp. practicing first aid. Coal miners may be called upon at any time to render aid to fellow workers.

The boys' first-aid team of Red Jacket, W. Va., practices on a patient. This training brings the educational work into the miner's family life.

Your men wear these Safety Shoes willingly!

S-4130—Brown elk with long wearing oil resistant sole and heel. Tapered top for maximum easy-walking comfort.

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Why this greater acceptability for Thom McAn Safety Shoes? Because men *know* the Thom McAn name—more men wear Thom McAns than any other shoe! They *know* Thom McAn means extra good looks . . . all-day foot comfort . . . more mileage for their money. And the rugged safety features mean protection-plus.

No wonder men want the familiar Thom McAn name on their on-the-job shoes! And remember: when men wear safety shoes willingly—they wear them every day. And *that's* what keeps safety records safe!

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Cut-Off Man John Smith of the Mt. Vernon, O., Window Glass Plant demonstrates old and new protective equipment. In this picture he is wearing old equipment, which consisted of leather cuffs, leggings, and shoe protectors. Many parts of his body were not protected.

In this picture, Mr. Smith demonstrates new equipment developed at Mt. Vernon: sleeves, safety apron and leggings, and improved shoe protectors. This equipment has eliminated lacerations from broken glass in the Cut-Off Department by covering vulnerable body parts.

Packer Gaylord Albert wears the new type of sleevelet extending to middle of palm.

Howard Thompson (left), Boss Cutter, and one of men examine improved shoe guard.

JAGGED EDGES

New types of protective clothing prevent lacerations in one of the country's leading glass manufacturing plants.

THREE years ago a campaign to stop injuries from broken glass was begun at Pittsburgh Plate Glass Company's Works Eleven, located in Mt. Vernon, Ohio. In the fall of 1947 the plant's Safety Department under Safety Inspector Carl Minideo designed new safety wearing apparel to protect window glass workers.

Mr. Minideo now has released figures which cover this three-year period in which new equipment has been worn. These figures are a convincing display of how effort and ingenuity, together with cooperation from everyone concerned, can solve tough problems. They show that where the new equipment has been worn, no lacerations (cuts and scratches from broken glass) have occurred.

The record of Mt. Vernon's new safety equipment can be summarized as follows:

1. Formerly, there was an average 52 lacerations on arms and shoulders a year in the Cut-off Department. During the past two years, no lacerations have occurred to anyone wearing Safety Sleeves.

2. Prior to 1948, there was an average of 62 lacerations on upper legs and knees a year in the Cut-off

James Montgomery shows the old-style leather apron and cuffs formerly worn by the cutters in Pittsburgh Plate Glass Co. plant.

Tank Repairman Andrew Sakala shows equipment formerly worn by men removing cullet from tanks. It consisted of gloves, cuffs, leggings and shoe protectors. Equipment was not satisfactory.

Mr. Sakala (left) and Robert Graham dig cullet in new equipment for Tank Repairman. This combination trousers and apron gives the wearer ample protection against the sharp cullet.

Department. With the wearing of the new Safety Apron during the past year, no lacerations have occurred.

3. The Cutting Department formerly averaged 72 lacerations on arms and shoulders a year. In the past two years, no one wearing Safety Sleeves has been lacerated.

4. Lacerations on the knees formerly averaged 12 a year in the Cutting Department. Since Safety Aprons have been worn, no injuries have occurred.

To understand better why these men were getting cuts and scratches from broken glass, their duties might be explained simply.

The Cut-off Department is located several floors directly above the glass melting tanks. As the window glass rises in a continuous ribbon from the tanks, it is cut off into various widths. Cut-off men then use machines to pick up the glass and carry it from the Drawing Machine to cooling racks.

Cutters are highly skilled men who cut glass into special sizes with hand tools. They must pick up glass from packs and place it on their felt-covered tables for cutting. Lacerations occurred when the glass they were carrying broke.

Packers crate lights of glass into boxes for shipment. Lacerations here were confined to lower arms as Packers generally handle small sizes of glass.

Protective equipment, of course, is nothing new at Mt. Vernon or the other PPG glass plants. For many years, Cut-off men have worn leather cuffs, *(To page 49)*

JINXED

In this picture, Montgomery is wearing the new equipment which gives greater comfort and safety: a bib-type apron and sleeves.

Ben Zeisloft, Transfer Man, is wearing old protective equipment for glass handlers. It consisted of jacket, leggings, shoe guards.

The equipment shown at left has been replaced with sleeves and light apron which are comfortable and give better protection.

HOW WRONG CAN THE BOSS BE?

By DONALD MONROE,
Safety Consultant, New York City

Safety directors must consider the point of view of management when securing approval for accident prevention measures.

A NEW job is always a challenge. The most natural impulse of a newly appointed Safety Director would be to make an effort to clear up the worst frequencies first, in order to make a quick "showing." In so doing it is quite possible that potential severities might be overlooked. The particular instance I have in mind occurred in a large beverage plant. Inspection of a group of pressure vessels revealed that on one of them the thermostatic control did not function. The Department Head assured the new Safety Director that there was nothing to worry about, because the operation in question was amply protected by three auxiliary control factors. Not wishing to antagonize the Department Head, the Safety Director did not insist on immediate repair of the thermostat. He figured he'd probably take up the matter again at some future time. Several weeks later one of those rare combinations of circumstance (of which human failure was a part) caused the vessel to burst—killing the operator! Who was to blame? The Operator?—In a measure, because he failed to adhere to correct procedure. The Department Head?—Possibly, because he lacked awareness of the danger of taking safety requirements lightly. The Safety Director?—Well, what do YOU think?

The basic thought this "Tragedy of Omission" should impress upon one's mind is that:

the time to insist on safety measures is THE INSTANT THE NEED IS RECOGNIZED!

Of course, it is one thing to determine the need for a particular safety requirement, and quite another matter to get the Boss to O.K. it. We can all tell stories about how we issued requisitions for safety items—how the Boss either held the matter in abeyance or refused to give his approval—and how someone was injured because of the lack of the item we had asked for. The dubious satisfaction of being able to prove to the Boss that we had told him so, is not especially gratifying when someone has been hurt. Furthermore, the Boss (or anyone else for that matter) doesn't like to be reminded that he has made a mistake in judgment.

The important question is "How wrong can the Boss be?"

The Boss has a job to do, and safety may be only one of his minor responsibilities. The Boss employs a Safety Supervisor because he doesn't have the time—or thinks he can't afford to be bothered with problems relating to accident prevention. One should remember that the Boss always intends to be right—that is what he is being paid for. When he is wrong about a safety matter, it can be assumed that the facts in the case were not completely or properly presented to him.

(To page 25)

WRONG FOOT!

Near McAlester, Okla., Sid M. Puryear, employee at the naval ammunition depot, got a bad bruise when a crate containing 1,900 pairs of safety shoes fell on his foot.

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EVER HAVE

Many people in safety work have been conditioned to the idea that whatever the Boss says is "law" and must be accepted without argument whether they like it or not. However, any safety measure that will certainly prevent the loss of life, limb, time or property, should assuredly be reviewed, revised and re-submitted until the Boss fully understands the purpose of the request as well as the Safety Director does. To put up a fight for accident prevention measures is not insubordination, it is common sense.

When you stop to consider the many and varied administrative responsibilities the Boss must assume—matters relating to finance, sales, production and industrial relations—you can understand why he must be given a concise, business-like presentation of facts, if he is to be in a position to make a sound decision regarding an expenditure for accident prevention. Getting his point of view in such matters is most difficult for those men engaged in safety work who have neither natural interest, aptitude nor training for it. On the other hand, those men who have chosen safety as a career (obviously not for its financial rewards, but for its many deeper satisfactions) usually know that they know more about safety than the Boss—and therefore employ a patient teaching technique when asking the Boss to spend money for safety.

It is unfortunate that the value of safety supervision is underrated by management in many organizations, with the result that men are being given safety jobs who have far too few qualifications for such serious responsibility. "How wrong can the Boss be?" Certainly, selecting the wrong man for the job is the wrongest thing he can do!

How to Convince the Boss

A well managed business has definite amounts of money set aside for specific purposes. When the safety department has to exceed its allotted appropriation, the Boss must be given some good reasons to justify his juggling with the budget. The easiest angle from which to interest the Boss in a safety proposition is to show how it has a bearing on production.

Safe operation is definitely an integral part of production. Direct and indirect loss of time and loss or damage of material or equipment are the most apparent factors that justify expenditures for accident prevention. Human factors, such as loss of life, suffering and the intangibles of better morale and the resultant increase in work volume, can be included in the presentation after the cold impersonal facts have been enumerated. Actually it is the human factors that are responsible for maximum hours of work, efficiency and consequent productivity. Unless the Boss has a certain amount of personal contact with the men in the shop, he may find it difficult to understand entirely and appreciate the human element. Therefore, present first the cold facts—then warm them up—and at the same time give the Boss a friendly lesson in Safety.

While it may at times seem desirable to have a big project over and done with at one time, there are advantages to be gained by working out a change-over program in easy stages. First of all you will be asking for a series of small appropriations, rather than one large sum, on which it might be more difficult to secure approval. In this way you also have an opportunity to demonstrate the value of your program, making it easier to have subsequent orders passed. Another advantage of making installations one at a time is that the men in the shop will not only get used to the new set-up, but with each installation they will be impressed by the fact that you are taking steps to protect them.

The safety executive is in a position to act as a stabilizing influence in his organization. A frictionless, happy atmosphere in a plant tends to keep accidents at a minimum. Thorough familiarity with the nature of grievance meetings will in time make it possible to bring about conditions and attitudes that will take care of "gripes" before they reach the grievance stage.

Since the attitude of the people in the plant is conceded to be important to safe operation, it might prove profitable to consider the adoption of a program that would provide acceptable recognition to those individuals in the plant who are making contributions to safety by alertness, suggestions, cooperation and constructive anticipation. You will find the pros and cons of Safety Award Programs discussed at length in SAFETY ENGINEERING for May 1949.

In conclusion, let me quote from another article in the September 1949 issue of this publication:

> "Safety work can lead to constructive developments in production. When machine guards are under consideration, the operator, foreman, plant engineer and time-study man can be brought in to review the operation in question. This procedure often leads to simplifications that may even cancel the need for the guard."

The Boss will always appreciate your effort to get things done most economically. When you do that—how wrong can YOU be?

Safety Via Comics

EBASCO Services Incorporated has announced that it has appointed Fawcett Publications, Inc., producer of the "Captain Marvel" and other comic books, to create a new booklet series designed to carry the story of utility safety work in connection with the public to mass audiences.

The artist and the script writer on the "Captain Marvel" series are doing the work on the new Ebasco booklets, employing the same comic book technique. Although a major portion of the Ebasco booklets will be devoted to the general subject of safety, the advantages and superiorities of the American way of life also will be stressed.

Get the Most

THREE ARTICLES ON THRE

WIRE ROPE

How to determine the strength of a sling
What difference does the core of the rope make?
When should wire rope slings be discarded?

By H. M. WILSON, Engineer,
Wire Rope Sling Department,
American Chain & Cable Co., Inc.,
Wilkes-Barre, Pa.

EACH day Industry, as a whole, is becoming more conscious that Safety pays. Not only is this true with respect to protection against injury to personnel, but protection to equipment and product as well.

Material handling is acknowledged to be a definite and important part of production. Losses from unsafe or inefficient material handling can easily turn a profit into a loss.

Where material is handled with overhead cranes, slings must be regarded as production tools. Not only safety, but in a measure the efficiency of the production procedure depends upon their proper selection, correct use, and accurate inspection.

Because of the widespread established use of wire rope slings, an understanding of the characteristics of wire rope as a sling material is a necessity to both the Safety Engineer and the Plant Superintendent. Only through such an understanding can a sound program of sling safety be obtained.

It is generally recognized that accurate tools are necessary for accurate work. This is true whether you consider the production of machined parts or the setting up of a safety program on wire rope slings.

The value of the most accurate evaluation of plant operating conditions for use in determining the required safety factor is much reduced unless that factor is to be based upon a definitely known sling strength.

Strength of Slings

The high strength of wire rope and its general adaptability to sling use have been proved by industry for years. However, from a safety standpoint it is necessary that in making the sling nothing is done which will unbalance the rope structure and lower its strength.

Unfortunately many of the methods commonly used in sling manufacture involve the complete disarrangement of the wire rope body. Such methods always result in a loss in strength and, since the amount of such loss is subject to serious variation, it is practically impossible to make *(To page 36)*

SLING

What is the effect of impact on chains?
Why are drop forged hooks preferable?
What is an adjustable leg sling?

By N. J. GEBERT, Engineer,
American Chain Division,
American Chain & Cable Co., Inc.,
York, Pa.

A SLING chain is just as important a piece of material handling equipment as cranes, conveyors, etc. but far too frequently it is accepted as just a piece of chain without sufficient thought being given as to whether it is suitable for the service it is to perform.

The question might justly be asked, "What piece of equipment assumes more responsibility than a sling chain?" particularly when thinking in terms of the unusual flexibility this product offers as well as the heavy and costly loads they carry.

There is no all-purpose chain. Each type has a definite place in industry and there is a grade for practically every conceivable use. Chains are available made from single and double refined wrought iron, carbon steel chain heat treated to 85,000 p.s.i. with Brinell hardness of 180; alloy steel chain heat treated to 125,000 p.s.i. with Brinell hardness of 250; stainless steel, monel metal, and silicon bronze.

The chain made from wrought iron is, of course, welded by the

Out of Your Slings

TYPES OF HOISTING EQUIPMENT

CHAINS

FIBER ROPE

FEATURE

This is the second of a consecutive series of three major articles dealing with Materials Handling. The next feature of the series will appear in the April 1950 issue of SAFETY ENGINEERING.

How can fiber rope slings be made to last longer?
What are the breaking strengths of various rope sizes?
How can the safe rope size for a tackle be determined?

By STEPHEN REED,
Field Engineer,
Plymouth Cordage Company,
Plymouth, Mass.

hand forge method whereas steel chain is electrically welded, as to date these heat treatable steels have not been successfully forge welded.

These heat treatable steels have a very narrow temperature range for good and dependable welds, but accurate temperature controls, operating with more than human accuracy on electric welders, have brought these chains into prominence. Manufacturers' catalogues typical of the industry are available, in which will be found chains fabricated of these various materials, and particularly designed to meet almost any ordinary plant conditions.

Do not study only the tensile characteristics of chains, for in trying to obtain one desired feature sometimes other features are lost. We all know that basically hardness resists wear, but watch the impact. Justification of increased cost to obtain certain features can easily be made because of longer life and the greater factor of safety.

Impact conditions caused by faulty hitches, bumpy crane tracks, slipping hook-ups, etc. must be given serious *(To page 37)*

WHENEVER materials must be handled or lifted, there must be some means of attaching them to a hoisting machine. For low piles, or moving objects from one place to another, modern lift trucks can do the job, but for high lifts, or moving from one unconnected level to another, such as removing material from the hold of a ship, some form of sling or net is required. On rough machines or materials, or for heavy bulk materials which are not easily damaged, metallic slings or containers in some form can be used, but for miscellaneous shapes and sizes or for packages that must be handled with reasonable care, fiber rope is the most satisfactory and safest material to use.

All vegetable rope fibers are composed of a ligno cellulose material and are subject to attack by cellulose digesting micro-organisms. Most of these organisms require favorable conditions of humidity and temperature to thrive. For general purpose use, out of doors, on land, or aboard ship, special treatments are not required as sunlight and the open air humidity is not favorable to the growth of the deteriorating organisms.

For marine work, when the rope is continually under water, or if the rope is stored under warm, damp conditions, specially treated ropes have been developed and should be used.

Construction of a rope has a decided effect on all its properties, especially on tensile strength, the abrasion resisting qualities and handleability. Tensile strength decreases as the hardness increases, while resistance to abrasion is just the reverse. A soft lay rope is the strongest, but it has the least resistance to abrasive wear. Soft ropes handle easily, and therefore distort easily. Greater care must be exercised in their use to prevent damage.

Rope Construction

Ropes are made by combining a number of yarns into a strand, and then three or more of these strands are combined to complete the rope. In the ordinary rope, the strands are twisted to the left, or counter

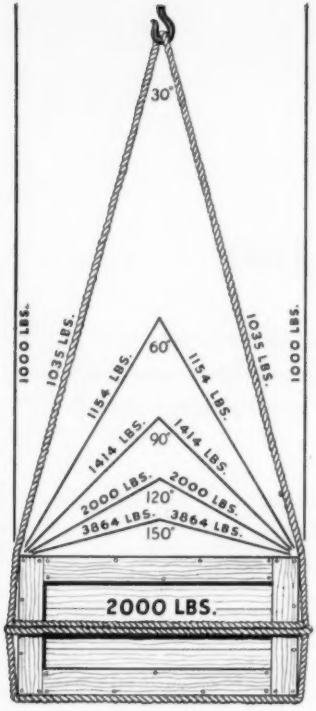


Figure 1. Rope tension increases rapidly as the angle of the sling over the load increases.

clockwise, and the rope to the right, or clockwise.

The relation of the twists between the rope and its strands determine what is commonly known as lay. Lay is usually designated as hard, regular or common, medium soft, soft, and extra soft. These terms are all relative and vary somewhat with different manufacturers; but the regular or common lay is the one most used for general purpose work and will be about the same in all brands. This lay has been determined, by long years of use, to be the most satisfactory for the maximum number of uses. This would be the lay obtained commercially unless a special construction were ordered.

Because of its reverse twists, it will be seen that if the rope is untwisted, more twist will be added to the strands, and vice versa. This is a very important consideration, because if too much turn is removed, or added, to a rope, the proper load distribution on the elements of which it is composed, will be disturbed, and the strength materially affected. Whenever, through use, turn is continually added or deducted from a rope, periodical balancing should be done so that the rope will be maintained as nearly as possible in the condition in which it was originally made. It is the ability to distort easily which makes it possible to coil a rope down.

Rope Slings

As previously stated, rope slings are very important tools in material handling. Slings are of two general types—the single line with an eye splice or thimble in each end, and the endless sling.

The single line with the eye splices in each end or "snorter" can be used by looping it around the load and hanging both ends on the hook, or it can be used by slipping one end through the eye on the opposite end and hoisting by a single part. The first method should never be used with only one sling as there is practically no grip on the load. When used in the second manner on packages of the same size, the wear is always in the same spot, necessitating the discard of the sling when worn in only a very short section even though the ends are continually reversed. Thimbles spliced in the ends materially reduce rope wear.

The double sling can be used as an open loop, by carrying the double sling around the load and putting both loops over the hook, or by slipping one loop through the other, thus making a self-binding sling.

The first two methods should not be used with one sling only. The third method is the most commonly employed and has the advantage over the "snorter" in that the bight does not occur continually in the same spot. When using slings, there are several precautions which must always be followed. Sharp corners must be protected by padding and the angle of the sling to the load should be kept as small as possible. Otherwise, extra tension is put into the rope. Due allowance should be made for the sharp bend over the hook as these all tend to reduce the effective strength of the rope. Figure 1 and Table 1 show how rapidly the tension in the rope increases as the angle of the sling over the load increases.

For new rope, a factor of safety of 5 is usually adequate for slings. But because the full tensile strength of the rope is never developed in a sling, its condition should be carefully watched and cuts or deep abrasions either repaired or the sling discarded. It should also be borne in mind that multiplying the number of parts of the sling does not increase the effective strength in proportion. Friction and sharp angles prevent the full utilization of all the parts. No definite percentage can be applied as each load is different, so good judgment and a high factor of safety are necessary to prevent losses.

Wherever possible, ropes should be spliced and not knotted. The short splice will reduce the strength of the rope by only about 5%. A well made long splice will retain

TABLE 1

Safe Loads for Slings in Pounds

Dia.	Safe Load for Straight Pull	Double (Two-Leg) Sling Degree of Angle *with the Horizontal* 60 degrees	45 degrees	30 degrees
1/2	530	743	612	437
9/16	690	968	797	569
5/8	880	1234	1016	726
11/16	980	1374	1132	809
3/4	1,080	1515	1247	891
13/16	1,300	1823	1502	1073
7/8	1,540	2160	1779	1271
1	1,800	2525	2079	1485
1 1/16	2,100	2945	2426	1733
1 1/8	2,400	3366	2772	1980
1 1/4	2,700	3787	3119	2228
1 5/16	3,000	4206	3465	2475
1 1/2	3,700	5189	4274	3053
1 5/8	4,500	6311	5198	3713
1 3/4	5,300	7433	6122	4373
2	6,200	8696	7161	5115

90% of the strength of the rope, but a knot is only 50% efficient. There may be a slight difference in the effectiveness of certain knots but it is safest to assume that each time a knot is tied, the strength of the rope is cut in half.

Ropes for Tackles

Another very common use for rope is as a fall in a tackle. When used in this manner, the first consideration is to be sure the tackle is properly reeved and it is well to remember that the rope is much stronger than the blocks so that it is the block which limits the load to be lifted.

Tables 2. and 3. show the weight and strength characteristics of common rope sizes and the strength of standard tackle blocks. The proper method of reeving blocks is also illustrated in Figure 2.

The mechanical advantage of tackle is determined by the number of multiplications of the fall. Theoretically, the mechanical advantage is indicated by the number of parts to the moving block, but a 10% friction factor should be added to the load for each sheave in the assembly. A simple example of figuring the mechanical advantage of any tackle is as follows:

Load to be lifted is 5,000 pounds. Tackle consists of two double blocks—4 sheaves, 4 rope parts at the movable block. Mechanical advantage—4. Friction loss, 4 sheaves: = 40%. 5000 pounds + 40% = 7,000 pounds. 7,000 pounds ÷ 4 = 1,750 pounds. Pull needed on fall—1,750 pounds. Assuming the rope is comparatively new, a safety factor of 5 to 1 is desirable. So 1,750 × 5 = 8,750 pounds, the required rope strength. Referring to the rope-size strength table, a 1-inch diameter rope, with a minimum break of 9,000 pounds, is a safe rope size to use.

Reference to the table on the safe working load for blocks indicates that the 8" block regularly used for 1" diameter Manila rope is not suitable for a 5000-lb. load. A 10" shackle block is required, a size regularly built for 1⅛" diameter Manila rope.

The safe working load for the blocks should always be checked when tackle is figured, as the rope is usually stronger than the normal sized block.

The choice of the proper factor of safety in tackle depends to a large extent on the experience of the user. With ideal conditions, that is, new high quality rope, proper size blocks, and no shock loading, a factor of safety of five should be used. With old rope, or with unfavorable *(To page 54)*

TABLE 2

Rope Sizes, Weights and Strengths

Threads	Nominal Size Circumference Inches	Diameter Inches	Weight per 100 Feet (Net) Pounds	Length No. of Feet per pound Feet	Gross Weight Approximate for Full Coil Pounds	Comparative Minimum Breaking Strengths Federal Specification TR-601a Manila Rope Pounds	Comparative Minimum Breaking Strengths Federal Specification TR-631 ** No. 1 Sisal Rope Pounds
6-Fine	9/16	3/16	1.40	71.6	50	450	360
6	3/4	1/4	1.92	52.2	50	600	480
9	1	5/16	2.71	36.9	50	1,000	800
12	1 1/8	3/8	3.77	26.5	50	1,350	1,080
15	1 1/4	7/16	5.15	19.4	63	1,750	1,400
18	1 3/8	15/32	6.14	16.3	75	2,250	1,800
21	1 1/2	1/2	7.36	13.6	90	2,650	2,120
24	1 3/4	9/16	10.2	9.8	125	3,450	2,760
27	2	5/8	13.1	7.65	160	4,400	3,520
30	2 1/8	11/16	14.7	6.82	180	4,900	3,920
33	2 1/4	3/4	16.4	6.12	200	5,400	4,320
	2 1/2	13/16	19.1	5.23	234	6,500	5,200
	2 3/4	7/8	22.0	4.54	270	7,700	6,160
	3	1	26.5	3.78	324	9,000	7,200
	3 1/4	1 1/16	30.7	3.26	375	10,500	8,400
	3 1/2	1 1/8	35.2	2.84	432	12,000	9,600
	3 3/4	1 1/4	40.8	2.45	502	13,500	10,800
	4	1 5/16	46.9	2.13	576	15,000	12,000
	4 1/2	1 1/2	58.8	1.70	720	18,500	14,800
	5	1 5/8	73.0	1.37	893	22,500	18,000
	5 1/2	1 3/4	87.7	1.14	1,073	26,500	21,200
	6	2	105.	.949	1,290	31,000	24,800
	6 1/2	2 1/8	123.	.816	1,503	36,000	28,800
	7	2 1/4	143.	.699	1,752	41,000	32,800
	7 1/2	2 1/2	163.	.612	2,004	46,500	37,200
	8	2 5/8	187.	.534	2,290	52,000	41,600
	8 1/2	2 7/8	211.	.474	2,580	58,000	46,400
	9	3	237.	.422	2,900	64,000	51,200
	9 1/2	3 1/8	264.	.379	3,225	71,000	56,800
	10	3 1/4	292.	.342	3,590	77,000	61,800
	11	3 1/2	360.	.278	4,400	91,000	72,800
	12	4	427.	.234	5,225	105,000	84,000

STANDARDS: Smaller sizes of rope are usually ordered by the number of threads, the larger sizes by circumference. 6, 9, and 12-thread ropes are packed in standard 25 and 50 lb. coils. All larger sizes are put up in full coils of 200 fathoms—in half coils of 100 fathoms. One fathom equals six feet.
** The figures shown in this column are 80% breaking strength of Manila rope. Federal Specification TR-631 Amendment-2, dated March 15, 1944 permits this minimum breaking strength to be reduced to 75% of that of Manila.

TABLE 3

Suitable Working Loads for Blocks (For Manila Rope)

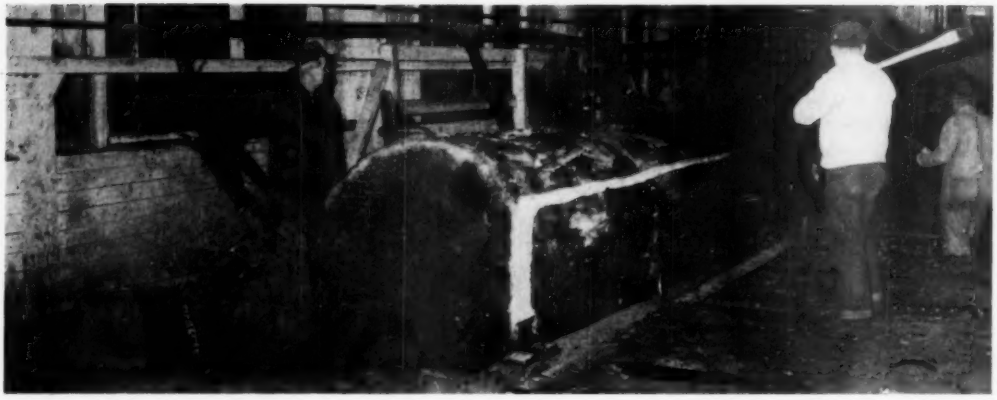
FOR REGULAR MORTISE INSIDE IRON STRAPPED BLOCKS

Dimensions Inches		Suitable Working Loads					
		With Loose Side Hooks			With Shackles		
Length Shell Inches	For Diameter Rope	Double and Single Pounds	Two Doubles Pounds	Two Triples Pounds	Double and Single Pounds	Two Doubles Pounds	Two Triples Pounds
3	5/8	290	380	490	400	800	1,200
4	1/2	480	550	700	800	1,400	1,800
5	5/8	500	750	1,000	1,100	1,700	2,100
6	3/4	1,000	1,500	2,000	1,600	2,400	3,000
7	7/8	1,500	2,000	2,500	2,000	3,000	3,700
8	1	1,700	2,450	3,200	2,400	3,600	4,400
10	1 1/8	2,600	3,400	4,200	4,000	5,400	6,400
12	1 1/4	3,000	3,750	4,500	5,000	8,000	10,000
FOR HEAVY WIDE MORTISE BLOCKS							
6	3/4	1,500	2,000	2,500	1,600	3,000	4,000
7	1	1,700	2,450	3,200	2,000	3,800	4,800
8	1 1/8	2,200	2,900	3,600	2,400	4,700	6,700
10	1 1/4	3,000	3,750	4,500	4,000	7,000	9,000
12	1 1/2	3,600	4,800	6,000	5,000	9,000	12,000
14	1 3/4	4,400	5,700	7,000	6,500	11,000	15,000
16	2	6,000	7,500	9,000	8,000	14,000	18,000

NOTE: These tables are shown through the courtesy of the Boston & Lockport Block Company and indicate suitable loads for one series of their standard and heavy blocks. These should be used as a guide only in ordering without assuming any responsibility—since the loads will vary between blocks in the manufacturer's line, and between blocks in other manufacturers' lines. Remember, too, that these are suitable working loads for BLOCKS, not rope. Safe working loads for rope are higher than those for blocks.

Lumbering Accidents Cut

By LESTER KRAMER, Personnel & Safety Director
Weyerhaeuser Timber Co., White River Branch, Enumclaw, Washington



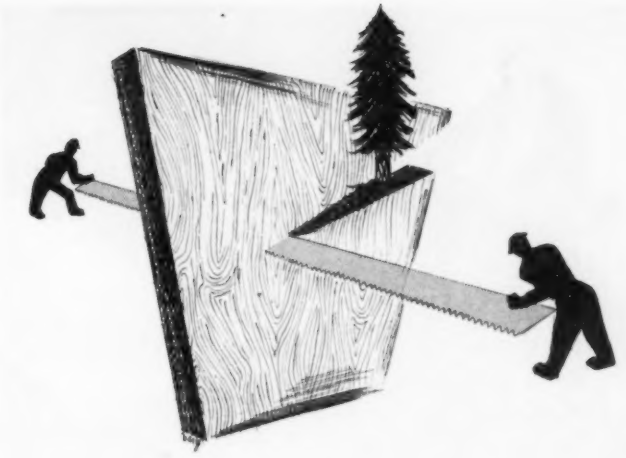
ABOVE—

Headrig carriage is protected by heavy steel guard rail. This protects doggers and settermen against injury from flying pieces or "wild" logs. Man in left foreground, Joe Cobish, had his life saved by this safety installation.

BELOW—

A tight load is a safety "must" in hauling logs to the reload station. To prevent shifting of logs in transit, particularly on curves, Leo Matthews is cinching up binder chain before he starts trip to the load transfer station.

Down



Lumbering is one of the country's most hazardous industries. Here is the way one company used a dual program to bring safety into both its logging and sawmill operations.

SAFETY in the woods and mill is a production problem that receives top consideration from plant management at Weyerhaeuser Timber Company's White River branch operation at Enumclaw, Washington.

During the war the firm concentrated on a program beamed at two production fronts—logging safety and plant safety. The first program phase was directed toward making equipment safe. The second phase was psychological—to take a strong company stand for safety and arouse the confidence of employees in being able to work safely.

Logging safety applies to work in any kind of weather, on steep or sloping ground, handling round logs which are poised to roll. Here the safety situation changes with every signal to the yarder and with every stroke of a saw or blow of an axe. Because each setup is new, complete repetition of safety knowledge and good judgment are necessary to prevent accidents.

Plant safety is concerned with a variety of spot hazards where men work on level footing, under a roof, handling flatsided material delivered to them by machinery and various types of conveyors. Here the safety situation is relatively constant and working installations can be analyzed and safeguarded through corrective measures.

With respect to foot traffic, the logger makes his own "fresh" trails, through standing timber, over felled timber or along the course of a newly blasted or bulldozed section of road. In contrast, the millman can utilize prearranged walkways and stairways, with protective railings, fences, signs and gates bearing warning signs to emphasize hazardous areas.

In logging, power units can be guarded with respect to gears drums and cable lines paying into the machine in operating position. Lines away from the machine cannot be guarded—there is no practical device which can be installed against whipping lines or chokers descending for the next turn of logs. Neither is there a constant guard against sudden wind gusts when falling timber or topping spar trees, or against the spring in a felled tree which can be released with terrific force when a bucker makes a certain cut.

Safety Depends on the Individual

These instances demonstrate the value of *individual* safe performance. Because safety results are no better than the kind of men working on the job, the White River operation is fortunate in having the type of men in both woods and plant who can profit from safety

A well signed plant is important in safety programs. Signs like this throughout the White River Mill constantly bring safety to the worker's attention and urge him to make use of safety equipment.

Roll transfer shifts heavy cants from headrig to bull edger. Installation here took operator from hole (in left foreground), a dangerous position, and elevated him to a safe place for operating transfer.

instruction. Men of long experience have developed into safety leaders, determined that accidents could and would be reduced to a minimum.

The pickup in safe practice was noticeable in all departments after the program was started. Loggers responded by analyzing the safety of each new setup and rigidly holding to the safe practice outlines in codes and by former experience. Hook tenders kept a determined safety eye on their chokermen and the chokermen on each other.

Safety in the woods is partly a matter of correct attire. Axel Erickson, loading transferman, is outfitted for work in snowy, slippery weather. His rigging includes steel-capped toes in rubber shoes, hard hat, safety glasses, heavy gloves.

On green chain, proper equipment is important. Clarence Smith has safety glasses, heavy gloves and heavy apron. The plank near edge of his left foot, extending length of green chain, is a safety device which keeps lumber ends from dropping on the toes of the green chain "puller."

Fallers made sure the buckers kept a watchful eye on their partners.

Truckdrivers watched their equipment closely, studied their roads for safety and reported repair needs. Powdermen checked their shots accurately, kept traffic stopped until safety was a known fact. Shovelmen used great precaution in judging ground and the possibility of upsets, rolling rock or swinging a dipper against a helper. Trainmen in all their switching and hauling of millions of feet of logs moved their rolling stock with the surety of safe knowledge and caution when visibility was poor.

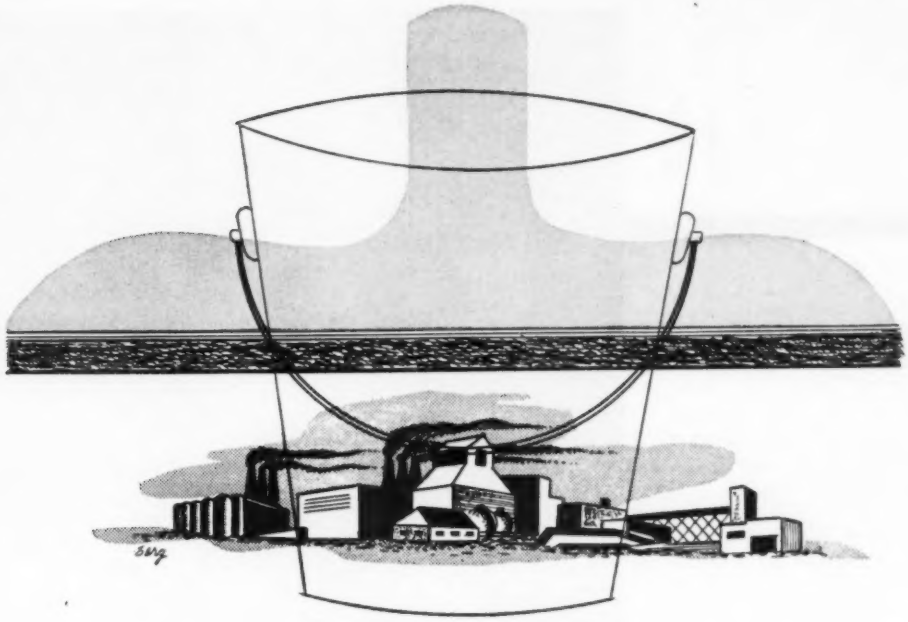
Loggers relentlessly cut their overall frequency of accidents from 111 in 1946, to 82 in 1947 and to 52 in 1948. More reductions are expected through their determination and confidence in being able to work safely.

Amazing records were set in various departments. Woods construction ran seven years with only four lost-time accidents. The several yarding and cold deck crews operated in 1948 with a total of 15 accidents, most of a minor nature. Fallers worked throughout 1948 with only one lost-time accident. Train crews on six engines with six full crews have had only one lost-time accident in four years. Other lesser records have been established, all of which make a good showing in our logging safety program.

Reducing Mill Accidents

In the plant, leaders of safety—individual employees as well as supervisors—began lowering the score. Plant frequency steadily moved down: 61 in 1946, 27.28 in 1947, 25.32 in 1948, and *(To page 56)*

Sawmill machinery must be properly safeguarded. Safety shield at operator's knee provides instant control of vertical resaw feed rolls, stops machine instantly in case of emergency. This prevents possible injury to operator. Installation was suggested by plant electrician, Gus Naastrom.



Are Cleaning Compounds Safe?

By GERARD R. DeNAPOLI,
Technical Director, Research Laboratory,
Masury-Young Company, Boston, Mass.

Are cleaning compounds safe? If you think so, then you had better find out about the four types of hazards which can be created by an unwise selection of cleaning compounds.

CLEANING is a process of removing soil and other extraneous matter from a given surface. It may be carried out by mechanical action, or by utilizing the physical characteristics of some cleaning medium, or by means of a chemical action. The method that is used depends primarily upon the nature of the soil to be removed, and the surface to be cleaned.

An example of purely mechanical cleaning is found in the sand-blasting of a steel surface, but this is generally costly, since energy and labor are used to a high degree. Its use is also limited because of possible damage to the surface being cleaned.

A cleaning operation, purely dependent upon the physical character of a cleaning medium, is found in the dry-cleaning of clothes. This is solely dependent upon the solvent power of the cleaning solution. A petroleum or chlorinated solvent is generally used. The operation is accomplished by the soil's dissolving in the solvents. Water-soluble soils may be effectively removed merely by the use of water. Unfortunately, soils that are generally encountered are not readily water-soluble, and the use of solvents is limited primarily because of their damaging effect upon many surfaces. Other reasons for avoiding certain solvents are their toxicity, flammability, odor, and their cost.

There are, then, some cleaning operations that are dependent upon chemical action alone. An example of this type of cleaning is the acid cleaning of metal. Here again, the use of chemicals alone for a cleaning operation is limited because of damage to the surface to be cleaned, and, in some cases, danger in handling and high costs.

Generally, cleaning is carried out by a combination of all three methods—use of mechanical, physical and chemical *(To page 50)*

FEATURE

This is the first of three feature articles concerned with Plant Sanitation. The next two articles of the series will be published in the April and May 1950 issues of SAFETY ENGINEERING.

Flaming metal? Yes, any metal will burn. The author outlines the relative dangers of the various metals, warns safety engineers against hazardous metal conditions, and offers eight rules for preventing metal-dust fires and explosions. In addition, he answers some very unusual questions, such as:

How can sweating cause a fire?
How can non-sweating cause a fire?
What actually happens in a metal-dust explosion?

THE safety engineer has a relatively simple task in convincing personnel that flammable liquids, dangerous chemicals and hazardous explosives must be handled with great care because of their recognized capacity for destruction. His job may be more difficult, however, when he tries to impress them with the dangers of metals from a fire standpoint.

The fact that tin-clad doors, sheet metal and steelplate shutters are specifically recommended to prevent the spread of fire tends to place metals in a non-hazardous category. In spite of these indications, however, practically every metal will burn if the conditions are right. Some burn slowly, some burn rapidly with explosive violence and others, because of chemical or indirect action, are potentially dangerous under exposure to severe heat.

When Is Sweating Dangerous?

According to a simplified definition, a metal is "an electropositive chemical element characterized by ductility, malleability, luster, and conductivity of heat and electricity." Perhaps by these standards it might be difficult to recognize some of those processed in your plant. While metals are supposed to have a certain luster, many workmen would have a hard time identifying some of them when the dull oxide coats the surface on exposure to the atmosphere.

Sodium and potassium are in this class. They are very soft, show a silvery white surface when freshly cut, but tarnish rapidly in air. They are used for the refining of grain size in aluminum casting, the removal of oxide scale from metals and the production of certain metals from their salts. In contact with water, these metals react violently. Hydrogen is liberated

FLAMING METAL!

By ARNOLD A. WEINTRAUB, B.S. (Ch.E.),
Member of Uniformed Force, New York City Fire Dept.
Member of the American Society of Safety Engineers

chemically with the evolution of enough heat to ignite it in the presence of air. Potassium oxidizes so rapidly on exposure to the atmosphere that it sometimes ignites spontaneously.

Because of their high chemical activity these metals must be treated with great caution. Small quantities such as those used in laboratories are kept under kerosene. If sodium or potassium are used in a laboratory set-up, prior arrangement can be made to pump nitrogen into the apparatus if fire starts.

A fire involving larger amounts would find these metals in hermetically sealed drums or tin cans. Water, of course, is taboo. The only successful technique for extinguishing such fires is the use of dry agents. Foam and carbon tetrachloride react explosively with sodium and potassium. Dry sand, soda ash or an excess of graphite powder are effective if the fire can be completely covered.

The account of an interesting fire in a British factory was recently recorded. A workman handling sodium was about to place the metal into an ether tank. Just as he was making the transfer, a drop of perspiration fell on the sodium. The heat evolved from the ensuing chemical reaction ignited the ether vapors and caused a serious fire. Here is clear proof that no matter how many precautions are taken, a fire-fighting force must always be available to handle the unpredictable.

The Most Flammable Metal

As with all other substances, metals become more easily ignited as particle size decreases. When metals are reduced to powders, as they are for use in paints, printing inks, dyeing and powder metallurgy, they assume their most dangerous characteristics.

Zirconium, magnesium and its alloys, aluminum and titanium powders present the greatest hazards. Reduced and carbonyl iron, manganese, zinc, silicon, tin and antimony are less dangerous. Cadmium, copper, chromium, lead, and milled iron powders, while still to be reckoned with, present a low order of flammability and explosibility.

Zirconium powder, little used until recently, is the most highly flammable and explosive of any used today. It burns rapidly with an intensely brilliant flame. An ignition temperature as low as 304 degrees F. has been reported for a pile of the powder. (Newsprint paper ignites at 446 degrees F.) Dispersed in air as a cloud, the zirconium-air mixture will ignite at room temperature. It is believed that static electricity spontaneously generated within the cloud itself is sufficient to cause the explosion. In tests to determine its relative flammability, diluting the powder with 90% of an inert substance did not prevent ignition.

The metal is used chiefly in the powder form and is supplied commercially in the wet state. Zirconium powder is employed in the manufacture of vacuum tubes. The powder, mixed with another substance, is applied to the plate set within the tube. When the tube is heated, the powder flashes and combines with the final traces of the residual gases within the tube to produce a more nearly perfect vacuum. Zirconium is also a component of ammunition primers and detonators. Other applications are in pyrotechnics, flares, photo-flash bulbs and for deoxidizing materials in the process of steel production.

When Is Non-Sweating Dangerous?

Practical considerations demand that all ignition sources be eliminated in the presence of zirconium powder, that dust accumulations be avoided and that quantities subject to a single fire be limited to the smallest amount possible. The powder is deemed so hazardous that in addition to the use of non-metallic tools, only workmen whose skin is moist and therefore less subject to the production of static electricity are acceptable to handle it. Investigators are still studying the fighting of zirconium fires, but available data indicates they can be controlled by foam or sand. Carbon tetrachloride, carbon dioxide and soda-acid extinguishers are not effective.

It is a wise precaution for a safety engineer to inform those who handle zinc, aluminum or magnesium powders under his supervision that they are particularly sensitive to moisture. The atmosphere in the storage *(To page 47)*

WIRE ROPE SLINGS

(From page 26) an accurate determination of the actual strength developed by the sling.

It would seem therefore, that as the starting point for a sling program on wire rope sling there must be a specification of the strength to be developed. The most logical and workable specification would be that the finished sling should develop the full catalog strength of the wire rope from which it is made.

While accurate knowledge of original sling strength is a sound beginning for the safety program, it is also necessary to have assurance that: 1. this strength will be retained under use for a sufficient period to be practical, 2. and that any deterioration in strength will be accompanied by surface indications which can be used to accurately determine the amount of strength lost.

These characteristics are obtained through the specification of the wire rope to be used in the sling. The work done in making a sling is the same regardless of the grade of wire rope employed. Therefore, economy alone would appear to dictate the selection of the strongest rope—improved plow steel. Moreover, since this grade of rope has the greatest resistance to cutting and abrasion, safety also dictates its selection.

What Ropes Are the Most Serviceable?

This necessary resistance to cutting and abrasion can also be increased by considering the individual wire size of the particular rope selected. A rope of 6 x 19 construction will be found to possess the highest strength, greatest resistance to abrasion, and yet have the flexibility desirable for sling use. This is particularly true for ropes up to and including one inch in diameter.

For slings larger than one inch, the 6 x 19 construction is still indicated where maximum strength and resistance to abrasion are necessary. However, for normal plant use it has been found desirable to change to 6 x 37 for the larger slings, and in these sizes the outer wires are large enough to give adequate resistance to cutting or abrasion.

Through years of experience wire rope users have found that where the wire rope is subjected to crushing or extremely severe operating conditions, one with a steel core gives much more dependable results as well as longer life. This fact has been proved by wire rope manufacturers as well, and is in accordance with their recommendations for selecting wire rope.

This superiority of the steel core over a fiber core is even more pronounced for sling use than for running ropes. The uniform support of the steel core continues under use and there is no such strand displacement as results from the crushing of a fiber core. This continued support protects against a gradual and hidden strength loss resulting from an unbalancing of strand tension and greatly reduces the tendency of the sling to become cranky in use.

After an extended series of tests it has been found that unless a sling made from wire rope with a steel core is actually broken during a lift no subsequent loss in strength results from even a serious overload. Therefore, safe reliance can be made on surface indications in determining the remaining strength of a sling made from this rope.

Sling Retirement

Once slings are secured of known original strength and made from wire rope with the steel core necessary to permit reliance on external indication of strength deterioration, the setting of a safe sling retirement program is not difficult.

It would not be practical to attempt to set a safety factor which would be adequate for all conditions. A factor high enough to take care of the most extreme applications would obviously be excessive for all normal lifts. Practical experience indicates that a 5 to 1 safety factor is adequate for general plant use so long as this is based on a definite sling strength and extends to all parts of the sling including all hooks, links, or other attachments.

It is not recommended that sling deterioration be allowed beyond a loss in strength equal to one safety factor as computed from surface indication. In other words, if the sling is bought with an original factor of safety of five it should be discarded when reduction in strength gives a remaining safety factor of four. If purchased at a 6 to 1 factor it should be discarded when reduced to 5.

Easily applied charts are available for determining the strength loss without any complicated computations. Merely measuring a certain length of the sling and counting the number of broken or cut wires will automatically indicate whether the sling is to be discarded or retained in service.

It must be remembered that this method of determination of the point for discarding a sling is recommended ONLY for slings of definite original strength and made from rope constructions given previously in this article.

That it is a highly practical system of sling control, however, has been proved not only by extensive laboratory test, but by records of plants which have used it for a number of years.

M. S. A. Export Div.

MINE Safety Appliances Company, Pittsburgh, has established an International Division to coordinate the activities of its subsidiaries in Canada, South Africa and Great Britain, and to continue the activities of the company's present Export Department. C. M. Donahue will be Manager of the new Division, in addition to his present duties as Manager of the Mining Division. H. E. Redenbaugh will be Assistant Manager of the International Division.

SLING CHAINS

(From page 27) consideration. One must at times sacrifice extra strength to get resistance to impact. Where conditions are standard and well known, a type of chain can be selected from the high or highest tensile series, which will show marked economy in operation with due respect to safety—but where various and adverse conditions of service are met and cannot be corrected, tensile strength and weight can economically be sacrificed for better impact resistance in the softer and more ductile products.

Impact

When considering the harder, more wear-resisting steel chains, we strongly recommend not reducing the chain size. To illustrate what is meant by not reducing the size of the chain when contemplating the conversion from iron to one of these harder steels, we refer you to Table I where 1,000 pounds was dropped on a 36" piece of chain from a height of one foot:

TABLE I

Number of 1000 lb. drops of 1 foot before failure Chain size ½"	
Wrought Iron	12
Heat Treated Carbon Steel (85,000 p.s.i.)	51
Heat Treated Alloy Steel (125,000 p.s.i.)	30

When the load dropped is varied according to the Working Load Limit the picture changes completely as per Table II.

As the impact is increased by increasing the height of the drop, the resistance to the shock of the harder materials decreases. It is better not to reduce sizes so that the resistance to impact approaches Table I and not Table II.

The added load put on the legs of chains by decreasing the angle with the horizontal is well known and need not be repeated here. However, in considering multiple leg slings, 3-legged and over, the load will probably never divide evenly. An allowance must be made for this. We have, therefore, found a very good rule to use is: on a 3-legged chain, figure the load as though you only had 2½ legs, and for a 4-legged chain, figure the load as though you only had three legs.

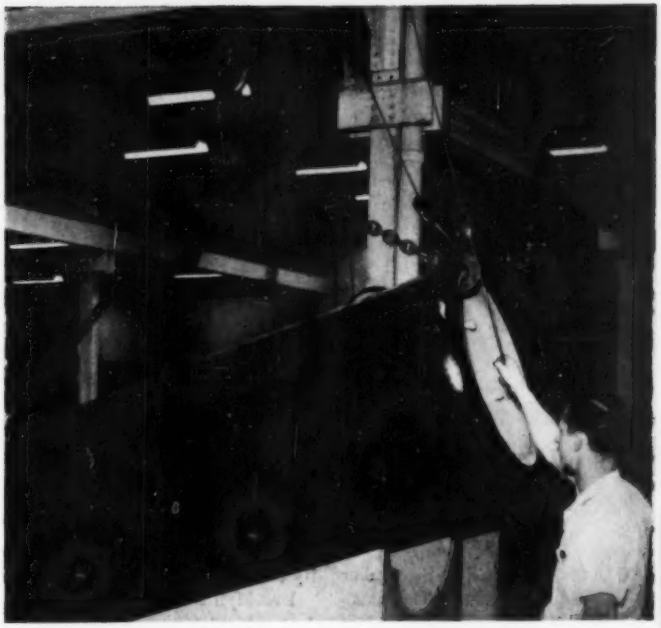


Figure 1. Adjuster for chain leg slings. The link is grooved to fit the chain and prevent slippage.

Design of the Link

Some mention should be made of the danger connected with the careless hook-ups. Always remember that chains are at their best when used in tension. Loads that cause bending of the links are to be avoided, especially when side welded chains are used. Sling chains welded on the end of the link provide a perfect hinge for the weld and give an additional safety feature, in that no bending in the weld is possible. Short links tend to reduce this hazard but cannot entirely remove it, and actual tests show the marked advantage of the end weld construction when chains are used over sharp corners or protruding objects.

Special Hooks

There are always lifts requiring special hooks where the standard sling or grab hooks will not operate satisfactorily. This is particularly prevalent in foundries where hooks must fit the trunnions on the flasks, and where used for transporting castings. Some of these castings can be lifted satisfactorily only by inserting the point of the hook in a hole in the casting. The point of the standard sling hook is not shaped for this type of loading. Until recently these special hooks were made by hand by a blacksmith and of course dimensions were not accurate, to say nothing of the high cost as compared to a drop forged hook.

To solve this problem a series of hooks were designed and dies made for their manufacture *(To page 42)*

TABLE II

Chain Size ½"	Load Dropped	Number of drops before failure Height of drop in inches 3"	6"	12"
Wrought Iron	1380 lbs.	60 to 65	18 to 20	8 to 10
Heat Treated Carbon Steel (85,000 p.s.i.)	2663 lbs.	140 to 150	24 to 28	10 to 14
Heat Treated Alloy Steel (125,000 p.s.i.)	4180 lbs.	85 to 90	10 to 15	3 to 5

TRANSPORTATION SAFETY

Traffic Engineers Meeting

THE New York Metropolitan Section of the Institute of Traffic Engineers has announced the 21st Annual Meeting of the Institute of Traffic Engineers to be held in New York City, September 24–27 inclusive, 1950. The Commodore Hotel has been selected as headquarters for the meeting.

Preliminary plans for this meeting, under the direction of Edward G. Wetzel, Chairman of the Annual Meeting Arrangements Committee, and T. T. Wiley, Chairman of the Technical Sessions Committee, are well under way. The program will include the following:

Annual Business Meeting;

Technical Sessions covering:

1. New developments in automobile, bus and truck terminal facilities, including inspection trips to:

Battery Parking Garage (1500-car capacity)—open about September 1950;

Port Authority Bus Terminal (5000 buses daily)—open about November 1950;

New York Union Motor Truck Terminal (2000 tons daily)—opened November 1949;

2. Administration problems of the Traffic Engineer;

3. City planning and the Traffic Engineer;

4. Traffic control and operations.

Optional inspection trips to view other new traffic facilities in the Metropolitan New York area including:

Van Wyck Expressway (connection between midtown Manhattan and world's largest airport)—open about September 1950;

New York International Airport (4900 acres—10 miles of 200-foot runway—1000-plane daily capacity)—opened July 1, 1948;

Brooklyn-Battery Tunnel (9230-foot vehicular tunnel)—open summer 1950.

Also under consideration are post-Convention tours if there is an expression of interest by enough members. This could give those that can remain after the close of the Annual Meeting an opportunity to see many other new traffic facilities of interest.

Traffic Accidents Can Be Prevented

IN RECOGNITION of its outstanding accident prevention record, Howard Sober, Inc., Lansing auto transport firm, was given awards by an insurance company at a mid-winter membership meeting of the National Automobile Transporters Association recently at the Book Cadillac Hotel. Drivers for the firm, during the past three years, drove over 71 million miles and over that period reduced accident frequency by 51 per cent and accident severity by 81 per cent.

Yours for the asking
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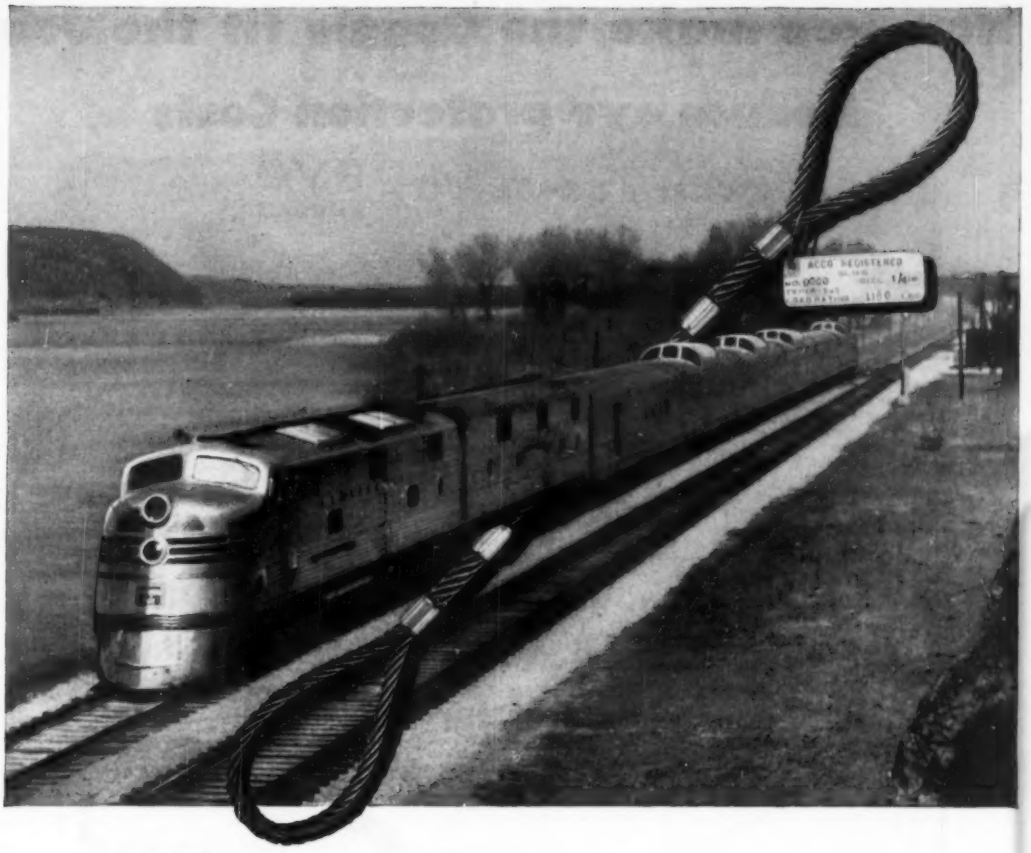
See page 79

Shipping Steel Products

A VOLUNTARY Simplified Practice Recommendation on Packaging, Marking, and Loading Methods for Steel Products for Commercial Overseas Shipments has been approved for promulgation, according to an announcement by the Commodity Standards Division of the National Bureau of Standards. Effective September 1, 1949 and identified as R237-49, the recommendation is available in printed form, from the office of the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 40 cents each. Do not send postage stamps or currency. A discount of 25 percent will be granted on orders for 100 or more copies.

The recommendation, which had its beginning in a proposal of the Committee on Packaging, Loading and Shipping Problems, of the American Iron and Steel Institute, is a 165-page, illustrated book, with paper-board cover, and is in five parts: general recommendations; protective coatings; packaging materials; definition of terms; packaging detail code; and recommendations for each of 55 different steel products.

The book also includes a brief history of the project, a list of the acceptors and the membership of the Standing Committee, the chief function of which is to consider revisions of the recommendation to keep it abreast of progress in the packaging art.



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Frame colors: light or dark.

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These methacrylate lenses are quickly interchangeable with either frame. Optically correct, shatterproof, in clear, light green, medium, and dark green, they rigidly lock in the deep strong frame channels which securely hold lenses so they can't be knocked in!

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Sling Chains

(From page 37)

by the drop design wherein throat openings are large enough to fit over the trunnion of the flasks and the point is forged to a definite diameter shown on the drawing as "spherical radius" for fitting into holes in castings when necessary. These hooks are constructed so that when loaded in the bowl they are as strong as the chain and when point loaded they are good for 50% of the Working Load Limit of the chain.

Adjustable Leg Slings

There are quite a few objects which are not in balance when lifted or which must be transported at a definite angle. A new adjuster has just come on the market, permitting the length of the legs of the sling to be changed or adjusted with complete safety. Fig. 1. shows this adjuster in use. The steel casting fastened to the pear-shaped link is grooved to fit the chain exactly the same as a pocket wheel on a chain hoist holds the chain with no slippage. In use, the chain is hooked on the object and the lift started. If the load is unbalanced and not lifting straight, it is immediately put down and the chain moved over to lengthen one leg and shorten the other. No tools are required and chain can be shifted easily and a safe hitch made.

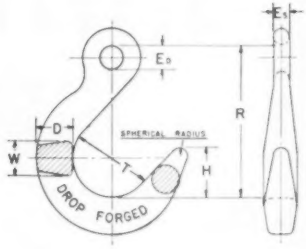
Chain Inspections

Regular inspection of sling chains by competent inspectors is of vital importance and should be followed methodically at intervals. The frequency of inspections will vary with the character of service to which chains are subjected.

This inspection should follow a definite pattern; a suggestion for which is outlined in detail in the 1948 Metals Handbook issued by the American Society for Metals. Many plants, having followed this general procedure, have established enviable records of safety as well as having effected worthwhile economies in operating costs.

If defects are revealed by inspection, chains should be tagged or marked in such a manner as to

FOUNDRY HOOKS



SIZE OF CHAIN	R	T	Eo	Es	D	W	H	SPHERICAL RADIUS
1/2	6 7/8	3 1/2	1	3/4	1 5/8	1 1/2	2 1/4	3/8
5/8	8 1/16	4	1 1/4	7/8	1 7/8	1 3/4	2 5/8	7/16
3/4	9 1/4	4 1/2	1 1/2	1	2 1/8	2	3	1/2
7/8	10 3/8	5	1 3/4	1 1/8	2 3/8	2 1/4	3 3/8	9/16
1	11 9/16	5 1/2	2	1 1/4	2 3/4	2 1/2	3 3/4	5/8
1 1/4	12 7/8	6	2 3/8	1 3/8	3 1/4	3	4 1/4	3/4

Figure 2. Drop forged foundry hooks have points of a definite diameter.

indicate that they are in need of repair or replacement. This practice, if allowed, will serve to prevent the use of faulty chains. When repairs are necessary, return chains to their maker so that they may be properly reconditioned with the same facilities as were used when originally made.

Don't take chances with slings—it doesn't pay.

Pictures by courtesy of the American Chain & Cable Company, Inc.

Award to Army Group

IN A brief ceremony at the U. S. Army's New York Port of Embarkation, Colonel G. D. Thompson, Port Comptroller, recently presented an "Award for Safety" to Lt. P. J. Halle, Shop Officer. The award was in recognition of the Signal Division's 424,909 manhours worked during the past eighteen months without a disabling accident. The work involved the stringing of "hot lines" and other hazardous assignments.

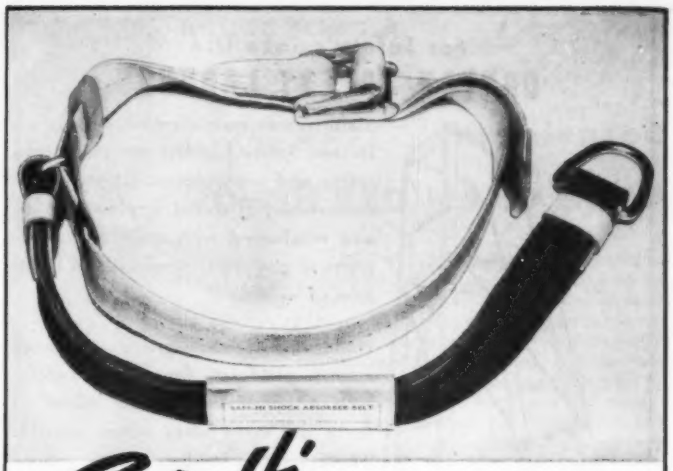
Safety Seminars

OPPORTUNITIES for specialized training in the teaching, supervision and administration of general safety education and driver education are being made available, on a nation-wide basis, to professors and instructors of teacher-training institutions and to state and city safety education supervisors. A series of five-day regional seminars are underway, conducted by the Center for Safety Education, New York University, in cooperation with the Schools of Education of five other universities, each functioning as training headquarters in its territory. Sessions have already been held at Northwestern University on March 13–17, while the seminar at the University of Oklahoma is scheduled for March 20–24. The four remaining courses are to be held as follows, the Seminar Director's name being given in parenthesis: University of California, April 3–7 (Dr. Helen V. Hammarberg); New York University, June 5–9 (Dr. H. J. Stack); University of Georgia, June 19–23 (Prof. E. B. Smith); Colorado College of Education, July 10–14 (Dr. L. C. Butler).

No Tuition Fees

A unique feature of these seminars is that there are no tuition fees. Instead, a number of scholarship grants are being made available in each region to qualifying members of the faculties of teacher-training schools and to state and city supervisors of safety education. These scholarships are made possible through funds granted by the Association of Casualty and Surety Companies to the Center for Safety Education.

Instruction at each of the regional seminars is being provided by Dr. Herbert J. Stack, Director of the Center for Safety Education, Milton D. Kramer, Assistant Director of the Center, and members of the faculties of cooperating universities.



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First Aid Training

(From page 20) hazards, and in an emergency involving co-workers he can be called upon to make great sacrifices. However, many of them do not realize the importance of giving first aid to a co-worker just hurt. Repercussions continue from the War Labor Board ruling to the effect that off-time safety training was compensable; therefore the question of voluntary versus paid time for first-aid training points up that need for more coordination between Federal, State, management and union.

First-aid training is affected by the size of the mine too. Most big, modern bituminous mining operations have professional safety engineers. Many properties too small to afford this can and do cooperate through their mining institutes. However, smallness is not a detriment in this first-aid education. Instances are known where the men have practiced the routine in a shack lighted only by a carbide lamp.

The Red Jacket Coal Corp., operates six plants in southern West Virginia and Virginia. About 2,000 of its 2,500 employees are miners. The Red Jacket Coal Corp. in 1948 received three citations for outstanding achievement, and its record is getting better. In the last three years the number of accidents has declined 52% while the severity rate dropped 87%. The number of foremen supervising sections without a lost-time accident for an entire year has steadily increased from 22 in 1946 to 79 in 1948 and 119 in 1949. The very good record of safety experienced is mentioned—not for inviting invidious comparisons—but to show that professionally conducted and intensive first-aid and safety programs is a policy of enlightened self-interest. The pay-off is that this company has not had a fatality in 14 months while producing 3,000,000 tons of bituminous coal.

In 1946 the top management of the Red Jacket Coal Corporation determined to have an intensive and effective training program and employed a training director. That's the first step—have top management determined. The next step was to convince the supervisory personnel. This step was easy because top management demanded it, realizing that safe work-

WANTED

JUNIOR SAFETY ENGINEER

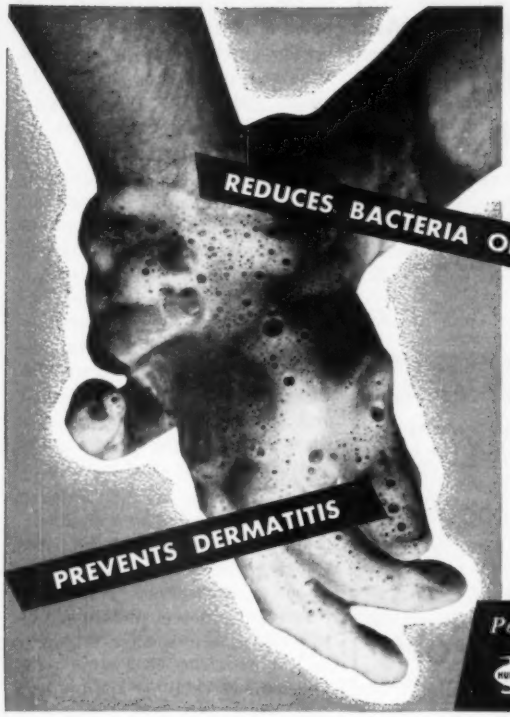
Opening at Los Alamos Scientific Laboratory, in Chemistry and Metallurgy Division. Should have B.S. in physical science, preferably chemistry or chemical engineering, and 2 years industrial experience (not necessarily in safety field). Write directly to Employment Director, Los Alamos Scientific Laboratory, P. O. Box 1663, Los Alamos, New Mexico.

New Representatives for Safety Shoes

JAMES H. CHILDS, JR., Sales Manager of H. Childs & Co., Inc., Pittsburgh, Pa., has announced that two new representatives have joined the Iron Age safety shoe staff.

Robert D. Burns is covering the New England states and New York City area for the firm. He is a graduate of Boston College, and previous to joining Iron Age, was employed in a sales capacity by a large manufacturer of men's shoes. Mr. Burns will headquarter at 39 Stone Street, Saugus, Massachusetts.

Iron Age will now be represented in the states of Texas, Oklahoma, Louisiana and Arkansas by G. L. Stevens, Jr. Mr. Stevens has been employed for the past few years by Dow Chemical Company as Safety Engineer in their Freeport, Texas plant. Previous to that he was associated with several shoe companies. Mr. Stevens' address is Box 243, Velasco, Texas.



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HAND SOAP WITH G-11*

ing reflects efficiency of management. The third phase was to enlist the union's cooperation and participation. Local union officials were approached personally and arrangements were made for having first-aid and safety talks at union meetings. In some cases the company program had good cooperation; in others the success fell below expectations. A union local voted to have all employees take first-aid training and accordingly requested us to make the training available. Most of the miners did not show up. "I'll attend if it is insisted upon" was a common excuse; others lived "too far away," etc.

Getting the Miner's Interest

At numerous meetings with the miners, typical cases of mishaps were described in order to increase interest. It was explained how ignorance of first-aid routine had brought aggravated injuries or death.

There was the example of a miner's son who fell into a pond. Pulled out of the water, the unconscious boy was rushed 17 miles to a doctor, but he died before arrival. Had this miner/father known first aid the life of his son might have been saved. The audience was told that it takes only a half-hour to learn the know-how of artificial respiration.

There was the case of a miner's back being injured by a roof fall. The man walked bent-over to the man-trip station, where fellow workmen, not knowing the fundamentals of first aid, advised him to straighten-up. In doing so he injured his spinal column, and a paralyzed back was the consequence which doomed this man to a wheel chair. Thus the meeting realized that a fundamental rule of first-aid ministration is NOT to move the patient until the nature and extent of the injury are diagnosed and treated. They were told of the five "musts" of first-aid work.

1. Keep him breathing, or restore his breathing.
2. Stanch the flow of blood.
3. Treat for shock.
4. Improvise supports for bone fractures, or protective coverage for the cut or bruise.
5. Prompt, safe and expeditious transport to the doctor.

Citing the tragic results of ignorance of first-aid know-how, publicizing the beneficent results of first-aid training, and more persuasive effort in getting the men to participate have gradually produced results. A fresh mishap would forthwith be discussed at the miners' meetings, and the what-to-do and what-NOT-to-do of the incident would be written-up in our employee magazine, the "Red Jacketeer," which devotes several pages to safety subjects on a central theme of "how first aid would have helped."

Throughout 1946 and 1947 the company efforts were intensified. Classes for miners were conducted at our six plants located within a 100 mile radius. These were held in schools and union halls. During

periods of work stoppages, when the men do not work, they usually can be induced to attend. At each of our six plants the company has built, or made available, buildings for these meetings and training sessions.

Adding interest was the training of boys in first-aid teams, and at one plant of a girls' team. This carried first-aid knowledge into the miner's home life. During 1949 we had six first-aid teams in county competitions, with four of them being winners. State-wide contests serve a worthy purpose, and it is hoped that coal-renowned West Virginia will stage such competitions. In the Williamson Field of West Virginia the Mingo County Mining Institute serves commendably. Organized in 1947, it promotes monthly meetings of supervisory personnel. It sponsors contests. Aside from its safety educational role, the institute is a good liaison among various company managements. It is indicative that while only four teams participated in its 1947 contest, the number has grown to 16 first-aid and mine rescue teams in the 1949 rivalry. Money awards and gold cup trophies are incentives to compete.

In summary, the bituminous coal industry has probably had a wider experience with first-aid training than any basic industry, and yet we need more of it on a professional, persistent basis. Visual aids for teaching, particularly more and better movies, would be an important step forward. The United Mine Workers union could and should exert more influence throughout the rank and file of its membership.

As to the indoctrination phase of first-aid training, there is an important need for more movies for teaching purposes. In World War II our fighting services proved how effective the motion picture can be in teaching men en masse the what-to-do's and what-NOT-to-do's for fighting men on the ground, in the sky and on the oceans. Visual aids are training tools which present a subject quickly, clearly and interestingly.

The U. S. Bureau of Mines has over 225 films, but only six are on first aid and safety and about five pertain to coal mining. More educational movies are an obvious need, and in my opinion it is parsimony —not economy—that there are so few. The National Coal Association could well serve its membership by getting first-aid and safety training movies for the thousands of the industry's mining force to see.

Working together in purposeful coordination, the Federal and State authorities, management and labor, could keep the bituminous industry's safety showing moving up and up. And the first-aid training phase is the elementary phase.

Pictures by courtesy of the Red Jacket Coal Corporation.

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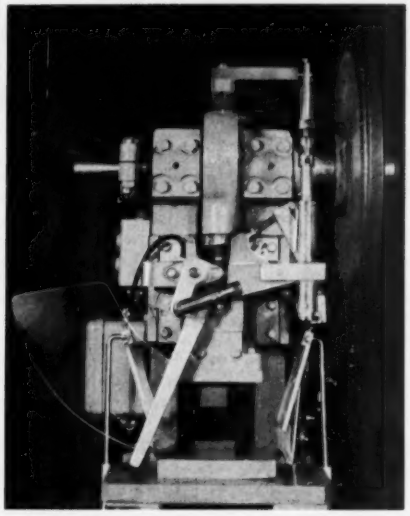

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New Safety Products See pages 76–78

Light & Sight Courses

AN INSTITUTE of Visual Sciences, with the College of Optometry as nucleus, is in the making at Pacific University at Forest Grove, Ore.

This Institute of Visual Sciences, is a part of administration plans to keep Pacific University in step with the rapidly growing industrial and cultural development of the Pacific Northwest.

Courses in illumination and color, occupational vision, eye protection devices, optics and biophysical research have already been arranged for the 1950–51 academic year, or are in preparation. These are in addition to the standard optometric courses.

First goals for the Institute of Visual Sciences are, new curricula leading to a degree in optics and to a professional degree in illuminating engineering.

Plans are to make the Institute a unit of the university in which students will find courses in study covering all the physical, psychological and physiological factors of light and sight. Services of the Institute will be made available to education and industry.

Flaming Metal

(From page 55) room must be dry or these powders will absorb the water vapor in the air with a consequent rise in temperature and possible spontaneous ignition.

As with carbonaceous dusts, the greatest danger of the metal powders occurs when they are dispersed in air as a cloud. Excluding zirconium, the ignition temperatures of the metal powder clouds range from 600 to 1,650 degrees F.

What Happens in an Explosion?

An interesting point of comparison between explosions of carbonaceous dusts (cornstarch, coal, grain, etc.) and metal powders is that the pressure evolved from the former is due to both the evolution of gases of combustion, which are greater in volume than the original mixture, and the heat of combustion, which causes a still further expansion in volume. In metal powder explosions, the final volume is usually less than the original, leaving only nitrogen in the atmosphere, and the rise in pressure is caused entirely by the heating and expansion of the nitrogen.

Observation of metal dust explosions in a tight container indicates the presence of a partial vacuum when the residual gas is cooled. Therefore any non-vented structure experiencing such an explosion would have its walls subjected to a collapsing pressure, the intensity depending upon the metal, all other conditions being equal. If the walls do not fail, the differential between atmospheric pressure and the resulting partial vacuum caused by a cooling of the residual gas will tend to collapse them inwardly.

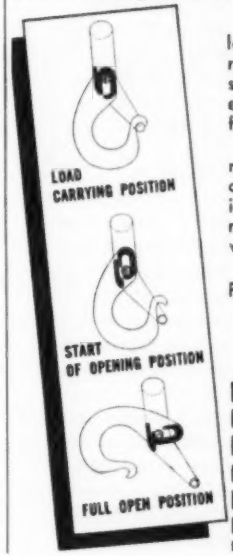
The destructive character of a metal powder depends to a great

Lift Loads Safely with BTC DROP FORGED SAFETY HOOKS

Here's the new, safer way to handle heavy loads — use BTC Drop Forged Safety Hooks. These sturdy hooks feature automatic mousing and a safety-tie lip lock that affords . . .

- Extra strength
- Prevents slings from slipping
- Prevents hooks from snagging or straightening

How the BTC Safety Hook Operates



BTC's mousing automatically engages when loads are applied; disengages when loads are released. The special shoulder and lip lock construction maintain the load carrying capacity even if pin should be sheared. All bearing surfaces are machined for accuracy.

Constructed from drop forged steel to insure maximum strength, BTC Safety Hooks are available in two sizes and types — 5-ton and 10-ton in either Eye Bridge or Shank Bridge. Both sizes replace eight standard open hook sizes, yet weigh only one-third as much.

For safer load handling, order BTC Drop Forged Safety Hooks from your supplier today.

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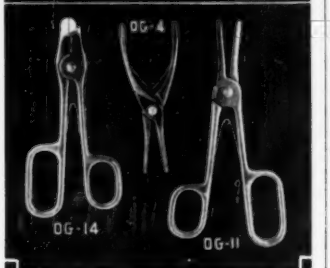

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extent upon the maximum pressure it develops in an explosion and the time it takes to attain that pressure. Cadmium dust, for instance, yielded a maximum pressure of 2 pounds per square inch in .067 seconds when exploded in Bureau of Mines tests. Tin powder, which is in the intermediate group, recorded a top pressure of 26 pounds in .108 seconds. Magnesium, in the most hazardous category, registered a maximum pressure of 72 pounds per square inch or over 5 tons per square foot in only .05 seconds. It doesn't take much imagination to realize what an explosion of such intensity would do to a structure. Properly designed relief vents will reduce destruction and pressure effect, but the magnesium explosion develops with such rapidity that the damage cannot be entirely avoided.

It is notable that magnesium, magnesium-aluminum, titanium, and zirconium can be ignited even if dispersed in pure carbon dioxide. They could not be exploded, however, in an atmosphere of pure nitrogen or helium.

The metal powders in an undisturbed pile will burn also but no explosive pressures are evolved. Ignition temperatures for the piles are lower than those required for the powder clouds. Piles of zirconium, magnesium and its alloys will burn vigorously even in atmopheres of commercial carbon dioxide and nitrogen which contain less than 0.5% oxygen.

Preventing Metal Fires and Explosions

Generally speaking, in order to prevent explosion and fire of metal powders:

1. Avoid formation of clouds.
2. Eliminate all possible sources of ignition.
3. Utilize dust processing equipment where indicated.
4. Avoid accumulations on ledges, beams and other similar areas.
5. Where dust is particularly hazardous, handle in separate building.
6. Buildings where hazard is present should have relief vents to minimize effects of possible explosion.
7. Take precaution to avoid spontaneous heating of powders, particularly after grinding.
8. Store zinc, aluminum and magnesium powders in moisture-free atmosphere.

To be continued in the April, 1950 issue of SAFETY ENGINEERING.

Luckey Returns to Dockson

MR. E. N. Luckey, well-known in the industrial safety field for 28 years, has been appointed general sales manager of the Dockson Corporation, Detroit manufacturers of welding and safety equipment, according to H. E. Piggott, general manager of that company.

For ten years to 1942 Mr. Luckey was a top-ranking salesman for the Dockson Corporation, and until rejoining Dockson in January, 1950, he operated his own business, Industrial Safety Equipment Company in Baltimore, Maryland.

Jagged Edges Jinxed

(From page 25) leggings from the knees down, and metal shoe protectors. Much work has been done in other PPG plants to develop effective safety protective equipment for production employees.

Wearable Clothing

Mr. Minideo learned after he started with PPG in 1946 that safety equipment has to be comfortable as well as protective. If it were cumbersome or hot, workers would prefer to risk injury than go through the misery of wearing it.

His first change was to replace the leather cuffs Packers were wearing with a sleevelet that extended from the middle of the palm to the elbow. It was made of cloth with leather mounted at spots where glass came in contact with the arm, resulting in a cooler, more supple article that eliminated skin rashes.

After many trials and false starts, sleeves to protect shoulders and upper arms were developed. They are separate sleeves which work independently of each other, made of lightweight but tough cloth and ventilated with aluminum grommet holes. To illustrate how easy it is to work in them, Mr. Minideo, a golf professional himself, says a golfer could wear them without hurting his game. Today all workers who risk lacerations on upper arms and shoulders at Mt. Vernon wear these sleeves whether they are required or not. They also are standard equipment in the company's other glass plants.

Leg Protection

Next, the problem of injuries to upper legs and knees in the Cut-off Department was approached. (Lacerations on the mid-section of the body are so rare that they are not a problem.) Leggings then being worn only protected the lower leg and foot and were so hot that workers often cut them off, leaving only the foot protectors. They also were costly.

The first solution was a combination apron and trousers. They provided ample protection but were too heavy, hot, and easily damaged. Finally a new combination bib, apron and leggings was evolved that snapped on like an apron. If protection is needed at the back of the legs, extra cloth panels can be snapped on. The first safety apron and trousers, however, are still used by tank repairmen, who must crawl over sharply-edged cullet.

Spats were improved to allow freer movement. They now consist of a metal shell mounted on leather, which is buckled to the shoe.

Men working together have written another chapter in the history of the company's efforts to eliminate industrial hazards.

Story by courtesy of "Pittsburgh People," a publication of the Pittsburgh Plate Glass Company. Pictures by courtesy of the Safety Clothing & Equipment Company.

Mr. H. Sebastian Jones looked at his dingy floors and cried, "What'll I do?"

Then he remembered what his flooring contractor had told him—"consult your nearest HILLYARD Maintaineer." So he telephoned. "Come at once!"

Rushing to the scene, the HILLYARD Maintaineer thoroughly examined the floors. "Mn! This one is neglected! This one is being ruined by improper care. But, I can SAVE YOUR FLOORS."

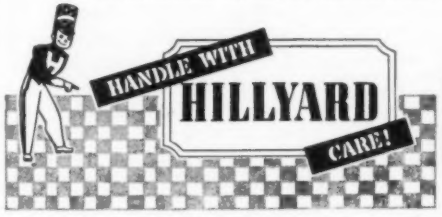
So the HILLYARD Maintaineer got busy with Super Shine-All, the neutral chemical cleaner . . . showed Mr. Jones how dirt and grime practically floats off floors when you use Hillyard's gentle acting cleaner that needs no rinsing . . . showed him which Hillyard products to use for a safe, lustrous polish. "It's a miracle!" exclaimed Mr. Jones.

"RIGHT!" said the Hillyard Maintaineer. "Scientific Hillyard care does the job in half the working time—cuts maintenance costs in half."

"How can I thank you!" said Mr. H. Sebastian Jones.

"Tell your friends." said the Hillyard Maintaineer. The services of Hillyard Maintaineers throughout the world are free to anyone with floor problems.

"Call on me anytime. My help is FREE and warehouse stocks are nearby."



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Industry's Needs to Achieve Safety

Editor of SAFETY ENGINEERING calls for greater effort in making safety a dynamic force.

HARRY ARMAND, Editor of *SAFETY ENGINEERING*, was the principal speaker at the Annual Safety Award Dinner of the Middlesex-Somerset County Committee, New Jersey Industrial Safety Commission on February 23. The dinner was attended by over 500 representatives of management and labor of the major industries as well as insurance men of the area.

New Jersey State Labor Commissioners Harber and Krueger awarded certificates to those industries of the Middlesex-Somerset area achieving the best safety records during the past year.

The keynote of Mr. Armand's address, "Industry's Needs to Achieve Safety," was the great obligation faced by safety directors, supervisory staffs, management and working personnel in dramatizing safety and making it a more dynamic force. To meet this obligation requires the cooperative effort of all the diverse elements making up the industrial picture. He stated that the role of human relationships, therefore, has gained tremendous significance as a factor in preventing industrial accidents.

Mr. Armand also stressed the dangers of the so-called "economy wave" which is seeking to cut production costs at the expense of the safety department. Not only is such false economy short-sighted, but it is even flying in the face of the statistically proven truth that spending money for accident prevention is saving money in production costs. The speaker concluded: "Progressive management realizes that such misguided tampering with safety activities is literally playing with fire and with accidents as well."

Cleaning Compounds

(From page 33) action. Since the use of mechanical actions, as a rule, means higher costs, either in energy or labor, it is naturally desirable that this form of cleaning be kept to a minimum. Since the use of special solvents as a cleaning medium are undesirable, except for certain specialty cleaning, water has become the common medium for the cleaning operation. The water must, therefore, be modified with materials or chemicals which will make the operation most effective. These chemicals, or combination of chemicals, are what are referred to as "cleaning compounds."

There are infinite numbers of cleaning compounds on the market today, each claiming its own excellence for its own specific use. However, other than the specialty products, such as window cleaners, rug shampoos, automatic dishwashing and hand dishwashing compounds, dairy cleaners, automobile polishes and similar type materials, the average maintenance man wants a cleaner properly formulated so he will have a general cleaner for most of his sanitation program.

Characteristics of Good Cleaner

A properly formulated general cleaning compound should be one which, when diluted with water, will impart a high wetting power, have strong emulsifying characteristics, and have good suspending properties. The wetting power is essential so that dirt films and grit will be penetrated by the solution. The oil and grease in the film must be emulsified by the compound. This means that the oily portion of the soil must become finely suspended in the solution. The grit, which is the insoluble matter or non-emulsifiable matter, must then also be held in suspension by the cleaning compound so that the insoluble matter will not readily settle out.

Most general cleaning compounds available today are either compounded fatty-based soaps, or com-

pounded synthetic detergents. Current national advertising has been favoring and expanding the use of the latter. Synthetic detergents do have a decided advantage over ordinary soap-based cleaners in extremely hard water areas (only about 5% of the country), but where moderately hard water or soft water is found, no such advantage exists over properly formulated soap-based cleaners. There are many varieties of so-called synthetic detergents of the non-ionic and anionic types, some excelling in their wetting properties; others in their emulsifying properties. A general cleaning compound must also contain a peptizing agent or a sequestering agent to overcome water hardness when such cleaner is a fatty type soap. These sequestering agents prevent the insoluble mineral soap precipitation, thereby eliminating soap scum. This results in full use of the applied soap, or, in other words, no loss in soap because of precipitation. This also results in proper rinsing properties. The ultimate, ideal detergent of the future will probably be a combination of soap and synthetic, one which overcomes the shortcomings of each type.

Selecting a Cleaner

Liability and accident insurance rates would be far lower than they are today if the maintenance engineer, safety engineer, or the ordinary janitor would use more care in selecting the proper compounds for the various cleaning jobs in industrial establishments and stores open to the public.

Many hazards are created by the use of improper materials. One hazard may be in the form of injury to its user, either because of its toxicity, its flammability, or its chemical effect upon the skin of the user.

A second, and probably the greatest, hazard created by poor selection is the improper floor cleaner which, more often than not, will leave a slippery floor. Slippery floors are the result of:

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For years a prime favorite of respirator users. Sponge filter saturated in water provides moist air — cool, comfortable breathing. Keeps out dust, fumes, smoke, paint spray. Face mask is of soft white rubber. Maximum visibility. Automatic valve exhausts breathed air instantly. Wear while paint spraying, or as protection against gases, dusts, smoke, fumes.

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1. Lack of sufficient detergent properties, thereby leaving an unemulsified film of grease or oil on the floor;

2. Lack of proper rinsing properties, thereby leaving a soap film on the floor;

3. Not properly fortified against the hardness of water used, thereby leaving an insoluble mineral soap film on the floor;

4. Excessively harsh cleaners which ultimately cause deterioration of the floor, leaving a cracked, uneven, unsafe floor.

A third hazard introduced by improper selection of cleaning compounds is the loss of light, resulting, as safety records prove, in increased accident rates. Window cleaners which leave a hazy film decrease the light in a room. Walls and ceilings which are cleaned by compounds which either lack sufficient detergency to remove the dirt film, or are so harsh that the paint gloss is dulled, will both act to decrease reflected light. Dull floors, because of improper cleaning, will also decrease reflected light.

A fourth class of hazard created by improper cleaning compounds is

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one which modern sanitary engineers are emphasizing more each day. This hazard lies in improper bacteria control, particularly in establishments handling food stuff. Walls and ceilings, whose paint surfaces remain unaffected by harsh cleaners, have been found to contain lower bacteria counts. The use of quaternary ammonium compounds in germicidal soaps and cleaners has become of more general use in dishwashing compounds, dairy cleaners, hospital hand soaps, bottle cleaners and other specialized cleaners. However, as the cost of these sanitizers decreases, their use will be adopted in the more general type of cleaning compounds.

Proper formulation will produce general cleaners which are safe to handle. Highly alkaline materials, or those containing free caustic should not be used as general cleaners, not only because of the hazard of handling, but also because of the damage caused by such compounds upon the surfaces on which they are used. Harsh alkaline cleaners will also damage flooring, particularly the composition type. Proper formulation will clean efficiently, rinse easily, and leave no scum or films on the floors. Proper formulation will also efficiently clean walls and ceilings without dulling paint gloss.

Economy in the choice of a cleaning compound should be the last consideration. This cost is but a fraction of the cost of labor involved in the cleaning operation, and is but a fraction of the cost of losses that are sustained by hazards introduced in using improper or cheap materials. The first consideration should be—"Is the compound safe to use?"; and, secondly, "How efficient is the compound?" Straight chemical cleaners are generally not recommended for use as general cleaners. Such practice usually proves to be false economy. Reliable cleaning compound suppliers should be consulted, and advantage taken of the services they have to offer.

Safety Equipment Plant Moves

THE American Industrial Safety Equipment Company, manufacturers of goggles, spectacles, helmets, face shields and other safety equipment has announced that it is moving its manufacturing facilities and offices to 3500 Lakeside Avenue, Cleveland 14, Ohio, from 847 Lexington Avenue, Brooklyn 21, New York.

The new location in Cleveland will enable the company to make over-night shipment to practically any point east of the Mississippi River. The company is moving to a building with facilities designed entirely for the manufacture of protective equipment, with additional space available for expansion. As a subsidiary of the Burdett Oxygen Company, located adjacently, it will have access to the equipment, facilities and technical skill of one of the largest independent manufacturers of industrial gases and welding equipment in the nation. It was expected that the entire moving operation would have been completed by March 1st.

Machines & Manlifts Are Hazardous for the Young

YOUNGSTERS under 18 will not be permitted to operate certain powerdriven metal-working machines cited as hazardous in a new order proposed by U. S. Secretary of Labor, Maurice J. Tobin, pursuant to the child labor provisions of the Fair Labor Standards Act.

Machines declared hazardous in the proposed regulation known as Hazardous Occupations Order No. 8, include rolls for bending or reducing the thickness of metal, all punching and pressing machines such as punch presses, brakes for bending sheet metals, power and drop hammers, and all shears used for cutting metals. In announcing the proposed order, Secretary Tobin cited the high percentage of serious injuries and permanent disabilities occurring in the operation of these machines—much higher than the average for all manufacturing injuries.

Secretary Tobin simultaneously proposed an amendment to Order No. 7 prohibiting the employment of minors under 18 on manlifts—endless belts equipped with platforms operating vertically through holes in the floors of a building. Outlawed in some locations as hazardous for all workers, these manlifts are primarily used in public parking garages, grain elevators, flour mills and the like.

Formal texts of the proposed order and the amendment will be published in the Federal Register. Copies may be obtained from the Bureau of Labor Standards, U. S. Department of Labor, which conducted the investigations on which the proposals were based.

Don't Miss the NEW PRODUCTS to Prevent Accidents

See pages 76–78

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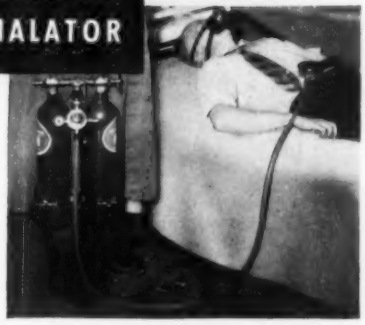
—and reduce "lost time"—

Scott DEMAND INHALATOR

EMPLOYEES requiring emergency oxygen for shock, fume inhalation, heart attacks, heat exhaustion, or respiratory difficulties can be treated simply, easily and effectively with this new Scott *Demand* Oxygen Inhalator.

Portable and easy to use, the Scott *Demand* Oxygen Inhalator provides emergency treatment in minimum time—and at minimum cost. Nominal initial cost; oxygen consumption comparatively low, due to the Scott "demand" principle which assures oxygen instantly at any rate and at any volume "demanded" by the patient.



Made by the manufacturers of the widely-used Scott Air-Pak Breathing Equipment. Over 10,000 in service.

TYPE "B" Scott *Demand* Oxygen Inhalator (above). With carrying case, without cylinders $147.50

Same as above, without cylinders or carrying case $123.00

Many other models, to suit every purpose.

See the Scott Demand Inhalator at the 20th Annual Safety Convention, New York City, March 28-31 — Booth No. 49.

ESTABLISHED IN 1932 Scott FOR SAFETY—FOR SERVICE

MEDICAL DIVISION

SCOTT AVIATION CORPORATION

217 ERIE STREET, LANCASTER, N. Y.

IN CANADA: SAFETY SUPPLY COMPANY, TORONTO, ONT.

Safety Record for Barge Line

RIVERMEN of the Union Barge Line's 10-boat fleet learned recently the meaning of the mysterious signs that have been hanging in their boats. Each month, since January, 1949, a black line was added to the signs. When the number of lines became 12, it signified a year of river operation without a single accident. It is believed to be the greatest safety record in modern maritime history. The accident-free year represented a total of over 800,000 man hours worked.

At ceremonies aboard the towboat "Pennsylvania" at Neville Island, 20 crew members were given wallets. Crewmen on the nine other ships will get theirs by mail, since it may be months before they get back to Port of Pittsburgh.

The "Pennsylvania's" feat is typical of the record of other Barge Line boats. It traveled more than 20,000 miles on inland waterways without an accident.

Streamlined, Rivetless, Seamless

sellstrom welding helmet

This No. 221 Welding Helmet offers maximum comfort and safety. It is extremely light weight, provides proper ventilation, absolutely excludes all light and assures complete facial protection.

The helmet is rounded; shaped without seams and made from tough, long-wearing fiber.

This helmet has our exclusive leather sweatband and patented head harness of non-absorbent Vulcoid. A convenient, adjustable friction hinge assures easy action when raising or lowering the helmet.

Equipped with our new two-piece Type A lens holder and spring-type chin rest.

Can be furnished with our new Sel-O-Matic headgear for easy adjustment to fit any size head. This is a feature which is very popular wherever it has been introduced to the actual workman.

We can also fit this helmet with our new Automatic Presto Shield. This is a very light weight device with extra eye shields. These are on top of the head under the hood when the helmet is down, but the moment the helmet is raised, the eye shields automatically come down to protect the eyes.

On your request we will gladly mail you literature which illustrates and describes these extra attachments.

Nearby jobber's name on request

sellstrom

MANUFACTURING COMPANY

Manufacturing more than 500 Eye and Face Safeguards

656 N. Aberdeen St., Chicago 22, Ill.

FIBER ROPE

(From page 29) rope conditions, this factor should be increased.

Care of Rope

While the manufacturer takes every reasonable precaution to safeguard his rope during shipment, carelessness in handling often results in damage. Before starting any important job even with new rope, it should be carefully examined throughout its length for accidental cuts, deep surface abrasions, or acid damage.

Rope is destroyed or deteriorated to an unsafe condition by one or more of the following causes:

External abrasive wear.

Internal wear due to excess bending under load.

Cuts and deep abrasions due to dragging over sharp objects.

Excess loading—over 75% of its breaking strength.

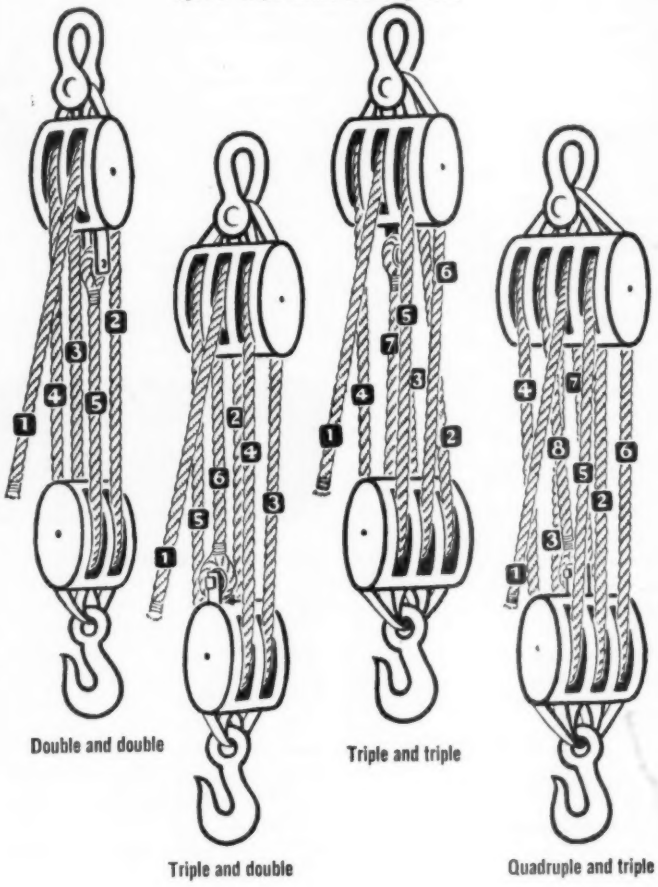
Contact with chemicals.

Bacterial deterioration of the fiber due to improper storage conditions, or the elements.

External abrasion can readily be seen. When the surface threads on small rope are worn about half way through, the rope should be discarded. With large rope, where there are many inside yarns, the surface, or cover yarns may be severely worn before the strength is dangerously lowered.

Internal wear can be detected by the white powdery residue of the inside fibers. Upon unwinding one yarn from the strand, the worn con-

Figure 2. Proper method of reeving blocks.



dition may be detected. Wear of this type is seldom found unless the rope is subject to excessive bending under heavy load. Heavy duty tackles sometimes fail from this cause.

Rope which is dragged over the ground, or is liable to swing against sharp objects should be carefully inspected for surface cuts. Most sudden rope failures may be traced to undiscovered surface cuts. Dragging a rope over the ground may work sand and dirt among the fibers, thus causing severe wear and fiber breakage. Rope with short protruding fibers, especially at the contline, should be viewed with suspicion.

Rope loaded in excess of 75% of its breaking strength will be permanently injured. This type of damage may be detected by an examination of the inside threads, which will be wholly or partially broken, depending upon the amount of overload.

Rope which has come in contact with acids or alkali should not be trusted. In most cases, acid turns the fiber a brownish color and the fiber of the contaminated section is weak and brittle. Alkali usually turns the rope yellowish in color. Its action is slower, but it is equally destructive. Animal excretions will destroy cordage. Any unusual discoloration should be regarded with suspicion.

Wet rope should never be stored in a confined space. Proper conditions of humidity and temperature foster the growth of a very destructive bacteria causing the well known "Dry Rot." Rope so damaged will have a musty odor, the fiber will become brownish in color, and its lustre and strength will be destroyed.

Rope exposed to atmospheric conditions will deteriorate about 30% in two years, due to weathering alone. The loss in strength due to wear must be added to this figure. In general, it is safe to say that rope in continual use will wear out before it is harmed by atmospheric exposure.

Rope continually in the water must be specially treated to resist the attack of the various marine organisms. In some sections these micro-organisms are so active that untreated rope will be completely destroyed in six months. There is little difference in the rate of deterioration in fresh or sea water.

The proper time to discard a rope is very largely a matter of experience. As surface wear increases, the factor of safety should be increased until good judgment says it is no longer safe. Acid damaged ropes should never be trusted.

When ropes are accidentally cut or damaged, they can be spliced with little loss of strength. A well made splice will retain about 90% of the rope strength. When increase in size is not objectionable, a short splice will give up to 95% efficiency. Most slings are made with a short splice.

Drawings and charts by courtesy of the Plymouth Cordage Company.

Electric Industrial Truck Association Elects

NEW officers of the Electric Industrial Truck Association, elected at the annual meeting, have been announced by the Executive Committee of the Association at EITA's offices in Philadelphia. They are: M. W. Heinritz, of Trenton, N. J., President, and W. A. Meddick, of Cleveland, Ohio, Vice-President. Wm. Van C. Brandt, of Philadelphia, managing director of EITA, was re-elected Secretary-Treasurer.

It was announced by Mr. Heinritz, upon assuming office, that the Electric Industrial Truck Association, which acts as a source of information to industry on matters pertaining to material handling involving the application of storage battery-powered industrial trucks, storage batteries and chargers, would continue its program of disseminating such information during 1950. This will be done by means of advertising, through promotional material, and through the education of membership field personnel along sales engineering lines.

Proved in Safety Programs by leading Industries . . . you can

CLEAN MORE FASTER, AND AT LOWER COST with HOFFMAN

HEAVY DUTY VACUUM CLEANING SYSTEMS

Plant cleaning takes less time and manpower — is done more thoroughly with Hoffman vacuum cleaning equipment. Higher suction — larger dust storage — bigger filtering area permit more cleaning (walls, overhead and machinery as well as floors) with less time out for disposal. The proven, modern method for eliminating hazardous dust conditions — with big savings that result. Portable units and stationary systems to fit your plant. Write *now* for a FREE Survey.

NEW AND OUTSTANDING
HOFFCO-VAC #30 PORTABLE

This new 3 h.p. portable has features previously obtainable only in larger models. Large bag filtering area. 4.4 cu. ft. dust container, and other new advantages. Built for heavy-duty, continuous service. Write for Bulletin A-752

HOFFMAN ALSO BUILDS MULTISTAGE CENTRIFUGAL BLOWERS AND EXHAUSTERS

U. S. HOFFMAN
MACHINERY CORPORATION
AIR APPLIANCE DIVISION
98 EAST 12TH ST., NEW YORK 3, N. Y.
CANADIAN PLANT: NEWMARKET, ONT.

Prevent accidents.
Provide comfort underfoot.

USE

AMERIFLEX

WOOD LINK

MATTING

Ideal for use around machinery. Keeps the feet off cold, damp floors.

Lies flat.
Substantially constructed for long service.
Beveled ends prevent tripping.
Grooves allow drainage.
Rolls up for easy handling and cleaning.
Any width up to 42 inches.
Any length.

AMERICAN MAT
CORPORATION
"America's Largest Matting Specialists"
1744 Adams Street Toledo 2, Ohio

( ) Please send prices on Ameriflex Flexible Wood Link Matting.
Please send information on ( ) Neo-Cord Counter-Tred Safety Matting; ( ) Tuf-Tred Tire Fabric Matting; ( ) American Counter-Tred Safety Matting; ( ) Ezy-Rug Colored Rubber Link Matting; ( ) Tile-Top Sponge Matting; ( ) Traffic-Tred Matting; ( ) Do-All All-Purpose Rubber and Cord Matting; ( ) Ever-Tred Vinyl Plastic Link Matting.

Name .....
Firm .....
Street .....
City & State .....

IN CANADA
OFFICES: American Mat Corporation, Ltd.
Canada Trust Building
Windsor, Ontario
FACTORY: West Lorne, Ontario

Better M.S.A. Service for N.Y. Area

MINE Safety Appliances Company, Pittsburgh, has announced the opening of a new and larger warehouse to serve eastern New York State and all of Connecticut. The two-story building, located at 5-45 Forty-ninth Avenue, Long Island City, N. Y., also will house the New York City headquarters of Mine Safety Appliances Company.

A large stock of MSA safety equipment will be carried in the warehouse to provide better service to customers. The building contains approximately 6000 square feet of floor space. H. J. Segrave is Manager of MSA's New York City district. The Albany, New York, territory will also be served by this new warehouse.

Petroleum Meetings

THE fire and accident prevention sections of the National Petroleum Association will hold its annual meeting at the Hotel Cleveland in Cleveland, Ohio on May 19–20, 1950. The meeting will feature special programs in observance of the 25th anniversary of the organization of the fire and accident department, which has sponsored meetings at various refineries in the eastern part of the United States.

The Kentucky - West Virginia group met recently at the Cabin Creek Refinery of the Pure Oil Company for a tour of the refinery and a discussion of mutual fire and accident prevention experiences.

The Bradford-Warren group has recently elected Mr. Paul Edwards, Socony-Vacuum Oil Co., Olean, N. Y. as chairman of this group.

The Tri-State group has toured the new processing facilities of the Ohio Oil Co., Robinson, Illinois, and elected the following officers for 1950: Chairman, Walter Monti, Pana Refining Co., Pana, Ill.; Vice Chairman and Secretary, A. B. Gerens, Wood River Oil & Refining Co. The next meeting of this group will be held at the refinery of the Calumet Refining Co., Burnham, Ill. on May 12, 1950.

The Michigan-Ohio group met at Findlay, Ohio for a roundtable discussion of fire and accident problems, followed by a tour through the plant of the National Refining Co. The meeting concluded with a talk by Mr. H. J. Eriesson, Director of Safety and Personnel, Refiners Transport and Terminal Corp., Detroit, Mich. on "Accident and Fire Experiences of Over-the-Road Transportation of Petroleum Products." Mr. Harry Elkins, representing the Washington office of the National Petroleum Association discussed the forthcoming annual meeting in May. New officers elected were: Chairman, Theron Arras, National Refining Co., Findlay, Ohio; Vice Chairman, R. W. Pollard, Leonard Refineries, Inc., Alma, Mich.; Secretary, H. B. McConnall, Pure Oil Co., Toledo, Ohio.

Lumbering Accidents

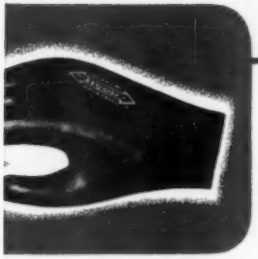
(Continued from page 52) a present 16 up to December, 1949. Both logging and plant, computed for company frequency, shows a steady decrease: 65 in 1946, 46 in 1947, 35 in 1948, to an expected "under 29 for 1949" (slogan for the year). This shows the trend from the first complete year after the war to the present, during which period crews became more stabilized and the company resumed normal operations.

Safety Installations

A few illustrations show how White River has applied safety to typical working spots.

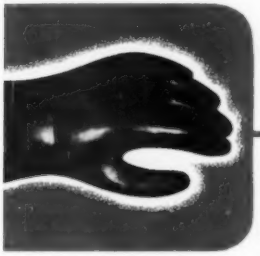
Several years ago a headrig guard, consisting of upright steel bars connected at the top by a steel bar, was installed in front of the doggers on the headrig carriage. It was designed to catch an occasional side sweep of slabs and to stop the fall of a log if tossed in the air by powerful steam niggers.

This device has saved a number



4703—Full Neoprene coated, rist style used in all types general ry. Liquid proof, curved fingers, ms on working surface.

7701—Fully Neoprene coated 4") cuff for use where dipping ions, spray or splash are not gh.



More Protection means More Production...

be sure with NEW, IMPROVED

HOOD

CURVED-FINGER GLOVES!

The job of meeting all-important production deadlines can be made much easier by providing the best possible protection for *your* employees' hands. To be *sure* of this protection from abrasives, sharp edges, chemicals, oils, etc., there is a Hood Industrial Work Glove that will do the job better! Two of those gloves are shown here.

Hood has built an enviable reputation in its more than 50 years, and that reputation, plus the world famous research that has made B. F. Goodrich "First in Rubber" stand behind every pair of these longer lasting, more comfortable, more flexible gloves. Write today for our latest catalog showing the entire line of Rubber gloves both Neoprene coated and Plastic coated.

HOOD *for NEW Safety plus*

HOOD RUBBER CO.
Watertown, Mass.
Division of the B. F. Goodrich Company

es and avoided a certain hich almost occurred one a log flew up and came top of the number one ho only had time to in- y duck his head. The log the steel bar with such the bar bent to the shape , striking the dogger just ugh to cut his forehead. of the protective steel was back on the job in nutes.

r working spot, known as roll transfer to the bull is unsafe for the transfer In line with the travel cants which he trans- is need of precision and so great that the law of eventually would have l" him for a serious acci- new installation was made. ator was taken out of the set to one side—above his out of the line of danger. nts on the green chain re- om dropped lumber, caus- hed toes, broken insteps and bruised ankles with monotonous regularity. This was largely solved by a 3" x 12" set on edge, fifteen inches out from the sorting table and parallel to it for its entire length. In appearance like a bin for sticks, its purpose is to catch the ends of dropped lumber and lessen the possibility of boards landing on the puller's feet. This installation, plus high safety consciousness of the crew, has added up to a long period without a lost-time accident—almost two years to date.

Another safety installation is at the vertical resaw. A plate shield on the roll nearest the saw, when touched with a hand or knee, stops the rolls instantly. Otherwise, a snagged glove or sleeve might pull one of the line-up men into the saw.

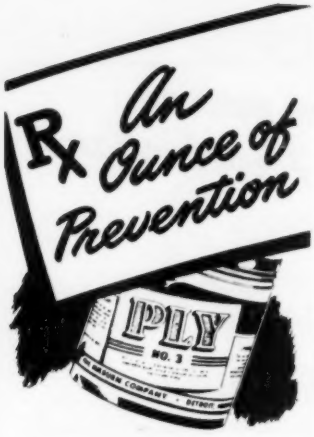
Making Them Safety-Conscious

Keen safety rivalry exists between departments. Statistical reporting of accidents is classified into twenty-three departments and frequency of accidents is weighed daily almost by the ounce. A lighted bulletin board near the personnel office flashes the safety record of the mill operations, by departments.

Good strong safety committees help take the guesswork out of daily operation. These committees are composed of men from the employees' union and a like number of supervisors, both from logging and plant operations. Meeting monthly, they report on inspections and discuss general safety. Suggestions are sought from employees; workable ideas are rewarded with cash prizes to the originator.

Although the program has had an occasional bad break and many good ones, it is satisfying that the frequency of accidents per million man hours worked keeps dropping like a golfer's score when he gains confidence in using what the "pro" has taught him.

Weyerhaeuser's White River branch takes pride in the men who are working safely at their job, who



We Will Tell You How to Do It— *AT NO CHARGE!*

It took 16 years to get the answers for *PREVENTION* of industrial dermatitis, *BUT*, now that we have this information it can be AN OUNCE OF PREVENTION which will save hours of lost work in *YOUR* plant.

OUR SERVICE IS *Free*

The doctor in charge of our PLY laboratory and his entire staff of medical consultants and chemists are at YOUR service. You will not be billed for any consultation, diagnosis or prescription.

"THE DOCTOR IS IN"

Write to us, describing in detail materials handled, exposure and other data you consider pertinent. If samples of materials handled or added information is needed, we will request them. If necessary, we will send a field representative to make a plant analysis. You will not be billed for this service.

Free —

Ask for a copy of "The Answer to Industrial Dermatitis," the only reference book of its kind. FREE SAMPLE of PLY furnished if you supply data on exposure.

Manufacturers of PLYGLOVS and PLY-GARB Plastic Safety Clothing

THE MILBURN CO.
3245 E. Woodbridge, Detroit 7, Mich.

though unidentified represent the *growing total of injuries that have been avoided*—injuries which statistics show would have happened in the absence of a strong safety program carried on by safety-conscious individuals. These employees and the program are rated as an intangible investment which pays dividends in sound bodies and lives saved. In safety, the employee has to win or everybody losses.

Pictures by courtesy of the Weyerhaeuser Timber Co.

Saving Those Eyes

IN AN article published in a recent issue of THE SIGHT-SAVING REVIEW, official publication of the National Society for the Prevention of Blindness, George L. Mitsch, manager of the St. Louis plant of the American Car and Foundry Company, has explained why none of his employees have lost or permanently injured an eye since 1923, although the eye-injury rate of the foundry industry is six times greater than the national average.

Mitsch listed these three factors as the main reasons for his plant's high safety rate:

"1. Talking safety to the employee on a strictly personal basis. You seldom hear of plant managers, safety engineers, or foremen getting hurt. Those who get hurt are from the rank and file . . . so why restrict our safety education and salesmanship to the safety engineer and foreman?

"2. Department safety meetings. The chairman of these meetings is a workman who has been selected by the others and who is perfectly free to discuss any phase of safety he desires. These meetings are held by the men—not for them. Realizing that he *is* 'his brother's keeper,' a fellow employee instantly warns the offender of his danger. I have seen it done time and time again and never have I seen any resentment displayed by either party; whereas I am sure that if it had been the foreman who had offered the suggestion, it might not always have been received in the same spirit.

"3. A 100 per cent goggles program. Management and safety directors must be constantly on the watch for failure to wear safety devices, because while usually it is merely carelessness, it may also indicate that something else is wrong. It can mean that the goggles do not fit or are uncomfortable—a matter for easy correction. Or it may be that an employee . . . requires special prescription lenses."

Mr. Mitsch noted that better union-management relations develop as a result of the safety meetings.

He also pointed to the "Wise Owl Club," a nationwide organization which started in his plant. This club is composed of workers who have had their eyes saved because they were wearing safety glasses.

Mr. Mitsch described the growth of the club in the ACF organization. In 1947, he said, the club was formed "and 76 candidates were found eligible. . . . In two years the membership has grown to 180 employees; 104 eyes saved."

Sevin Retires from Pittsburgh Plate Glass Co.

AFTER fifty years service in Pittsburgh Plate Glass Company's traffic department, Addison J. Sevin has retired from active service, according to a recent announcement by Richard B. Tucker, executive vice president of the firm.

Widely known throughout the traffic world and the glass industry, Mr. Sevin has served as general traffic manager for Pittsburgh Plate Glass Company since 1931. He had joined the traffic department in 1899 as a clerk and a stenographer and had served as chief clerk for thirty years.

Mr. Sevin is a member of the executive committee of the National Industrial Traffic League, the Traffic and Transport Association and past president of the Traffic Club of Pittsburgh. In ill health during the past year, Mr. Sevin retired to regain his full health.

FORK TRUCK AIDS FIRST AID. When a truck overturned in a traffic collision near the Minneapolis-Moline Power Implement Company plant in Minneapolis, a fork truck was provided by the company as an aide in moving the victim. After firemen had carefully lifted the injured driver through the upper door of his wrecked vehicle and onto a stretcher, the fork truck gently lowered the litter to the ground. While this was an industrial "lifting" emergency, fork trucks were similarly used during the war to transfer stretcher cases to planes for evacuation to hospitals.

Spontaneous Combustion

WHAT causes oily rags tucked away in a closet to catch fire all by themselves—and what can be done to control this "spontaneous combustion"?

Researchers at the National Board of Fire Underwriters and the National Bureau of Standards are trying to find the answers to those two questions.

Some fairly common substances heat up by themselves under certain conditions, and frequently cause serious fires. Unslaked lime, although it will not burn, heats up when it gets moist and then sets fire to any nearby combustible material.

Oily rags will heat up at ordinary room temperature, and burst into flame. This is the result of oxidation. Linseed, soya, cotton, olive, and grape oil will ignite spontaneously, and even iron will do so when it is reduced to powder. Charcoal and soft coal are also "self-heating."

Hay and grain still mystify the scientists. Why does a stack of hay suddenly catch fire without any outside help? One theory is that microbes in the hay soak up a lot of oxygen, causing a chemical reaction. This chemical reaction produces heat—and the farmer loses his pile of hay . . . and maybe the barn it's stored in.

The scientists, still studying the mysterious process, have this advice for farmers: Cure the hay before putting it in the barn, and keep a thermometer stuck in the hay. When the temperature reaches 212 degrees, call the fire department.

To ordinary householders, the experts suggest: Throw away oily rags. Don't store combustible materials in attics. Keep oily mops where air can circulate around them freely, or, better still, keep them in metal cans.

Plastic Wall Tile

A RECOMMENDED Commercial Standard for Polystyrene Plastic Wall Tiles and Adhesives for Their Application has been submitted by the Commodity Standards Division of the National Bureau of Standards to manufacturers, distributors, users and other interested groups for their consideration and acceptance.

This recommended standard establishes a minimum standard of quality through approved methods of test, materials, requirements for workmanship, tolerances, thickness, opacity, internal stress, colorfastness and other details of manufacture, which should insure a satisfactory product for wall and or ceiling installation in private or multiple-unit dwellings as well as for commercial, industrial, and other types of buildings where a non-absorbent, sanitary surface is desired. Requirements for the adhesives to be used for installing the tile are also covered in this recommendation. A standard procedure and important considerations in connection with the installation of the tile are included in the appendix of this recommendation.

A limited number of mimeographed copies of the recommended standard are available upon request to the Commodity Standards Division, National Bureau of Standards, Washington 25, D. C.

CAN ASPHYXIA STRIKE WORKERS IN YOUR PLANT?

Crushing accidents . . . severe electrical shock . . . heart attacks . . . heat suffocation . . . monoxide poisoning . . . smoke suffocation . . . drowning . . . and other forms of asphyxia can strike down workers in your plant no matter what you make. Industrial experience has shown that accidents involving asphyxiation can occur despite the most carefully laid safety precautions. And when a worker stops breathing, time and death will not wait for haphazard rescue efforts.

SAVE WORKERS LIVES COMBAT DISABILITY with an E & J RESUSCITATOR

YOU HAVE A RESPONSIBILITY to protect your workers from asphyxial hazards, to prevent loss of man-hours, and to minimize company liability for death or injury.

YOUR BEST PROTECTION when asphyxia strikes is the automatic resuscitation action of an E & J Resuscitator. This life-saving instrument breathes for those who are unable to breathe for themselves. Through a face mask it introduces oxygen into the victim's lungs and exhales for him. Because it automatically adjusts itself to lung capacity, the E & J Resuscitator is as safe for a baby as it is for your strongest worker. It is light and durable . . . one person can carry . . . operates on its own oxygen power . . . is easy to use. See for yourself why this safe, efficient instrument is considered essential equipment by industries, rescue squads and hospitals the country over. Send coupon below or write for a demonstration. There is no obligation to buy but you owe it to your company to see the resuscitator in action.

E&J *The Breath of Life*
. . . RESUSCITATOR-ASPIRATOR-INHALATOR

E & J MANUFACTURING CO.
GLENDALE 1, CALIFORNIA

to: E & J MFG. CO., Glendale, Calif.
☐ Please arrange an E & J demonstration.
☐ Please send complete E & J literature.
name _____
title _____
firm _____
address _____

LEARNING THE HARD WAY

FAULTY EQUIPMENT

TWO employees were engaged in replacing the cover on a refinery boiler feed-water pump. This cover was lifted by a block and tackle with a ½ inch rope. While they were pulling the rope, it severed and the pump cover fell to the ground, striking one of the employees on the leg. Ropes and pulleys, like all other equipment must be examined periodically to insure its being in good condition.

LAUNDRY WITH VAPORS

IN AN automobile plant, a laundry machine was used to wash aprons and wiping cloths soaked with naphtha and grease. Shortly after the machine was started, the naphtha vapors were ignited by a short circuit in wiring. Fire flashed over the machine and near-by piles of used wiping rags. Fifteen sprinklers operated and confined the fire, while firemen extinguished it with three hose streams. Water damaged electrical equipment on the machine and crank shafts in the floor below.

Laundering of wiping cloths used for volatile, low flash point paints or thinners should be carried on in specially designed machinery having ample exhaust ventilation and vapor-tight electrical equipment, in a sprinklered, well cut-off and drained building.

FALLS ARE EASY

AND the landing is hard. Like the great majority of accidents, falls could be prevented if people would use a little common sense. Take the case of a petroleum worker who was in the act of emptying a 5-gallon can into the tank-truck compartment when his foot slipped from the catwalk of the truck. Maybe it wasn't his fault that the catwalk was slippery from motor oil which had been spilled previously, but it shouldn't require too much mental effort to figure out that the sensible thing to do would be to clean up the slippery surface before mounting the catwalk.

K71 OXFORD
K81 HIGH SHOE
Sturdy Black Elk
Durable, Oil-Resisting
Neoprene Soles and Heels.
IN STOCK
SIZES 5 to 12
WIDTHS C, D, E, EE.

Knapp Saf-Test Shoes
Aerotred Cushioned

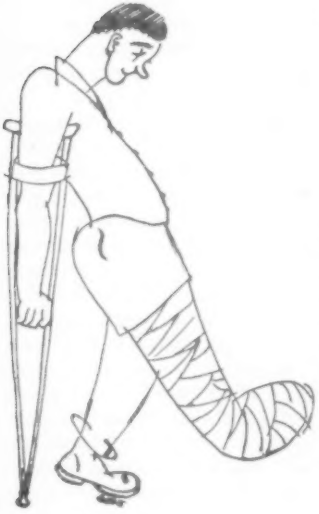
SAFETY . .
DURABILITY and COMFORT!

Thousands of workmen definitely prefer Knapp Aerotred Saf-Test Shoes. They know that the Original Air-Cushioned Innersole affords day-long comfort and keeps them foot-fresh and efficient through long hours. They feel safe in the knowledge that the Austempered Steel Toe Boxes with Anchor Flange fully meet the testing requirements of American Standards Association . . . And, too, they know Knapp built-in quality means long, satisfactory wear . . . Yes, for Safety, Durability and Genuine Foot Comfort . . . the preference is for Knapp Aerotred Cushioned Saf-Test Shoes.

For full information write Mr. W. C. Sprong, Saf-Test Dept., Knapp Brothers Shoe Mfg. Corp., Brockton 61, Massachusetts

BACKWARD STEP— BROKEN ARM

WHILE unloading material from a trailer truck that was partly equipped with side racks, a west coast supply depot worker suffered a painful arm injury resulting from a fall.



As the crane operator started to lift a load off the truck it became necessary for the worker to step clear of the lift. In doing so he, without looking, stepped backward through the opening in the side racks.

The simple process of looking where you are stepping will avoid this type of accident. This accident also points up the necessity of being familiar with the inherent hazards and conditions about the working area.

LEARNING THE EASY WAY

TWO accidents in less than two weeks time occurred recently in a West coast lumbering operation. In both cases, death was averted by the use of safety hats. In one accident, a faller was struck on the head and shoulders by a falling limb. The hard hat was bent, but prevented more serious injury than a fractured shoulder.

In the other, a powder-man was struck by a flying piece from a stump. Again, the hat was dented, but the wearer received only a slight fracture of the skull and bruises on the back. Both men lost time in recovering from their injuries, but without the hats they would have lost time permanently.

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Treat Oxygen With Respect

(From page 18) when compressed to high pressure, is a hazardous material which must be considered and handled with respect and caution.

Compression Dangers

It is true that any compressed gas presents some hazards due to the potential energy which is stored within it. Cylinders in which a compressed gas is contained, and piping and valves through which the gas is conveyed under pressure, as well as the regulators and gauges which control or indicate its flow or pressure, must all be selected with the thought in mind that a gas compressed to, let us say, 1800 p.s.i. is exerting 1800 pounds of force on every square inch of area of the system which encloses it. All that is needed is one weak spot, and it will burst its bonds with explosive force.

Oxygen, however, presents additional hazards: the hazards of either a true combustible explosion, or of combustion following the explosion. True, oxygen itself is not combustible, but it is oxygen which makes combustion possible. A candle will not burn in an atmosphere from which the oxygen has been removed; but steel will burn to a cinder in the presence of pure oxygen.

Danger of Contaminants

Perhaps the most common cause of oxygen explosions has been the contamination of cylinders, valves, fittings or gauges with oil. Gauges intended for use with oxygen, and oxygen cylinders and valves, are usually plainly marked "Use No Oil." But time and time again explosions have occurred which can be directly traced to oil-oxygen reaction, and many more explosions are believed by deduction to have been caused by contamination.

While oil easily takes first place as an unholy accomplice of oxygen, there are other lubricants which have been on occasion equally dangerous. Glycerine is often used and considered as a safe lubricant for oxygen valves and fittings; but the truth of the matter is that glycerine is combustible, and under the right condition glycerine in contact with oxygen can cause a combustible explosion. The same is true of fatty soaps.

Another cause of oxygen explosions is the presence of particles of organic matter in the cylinder or elsewhere in the system. Paper, wood, lint, dust, any material which is combustible, if exposed to high pressure oxygen, can cause an explosion. Likewise, dust chips, scale or other particulate incombustible matter in an oxygen cylinder or elsewhere in the system can cause an explosion. Such particles can cause ignition by friction or by static charge and discharge. Since all commercial oxygen cylinders are made of steel, ignition within the cylinder by a fragment of organic material or by particulate matter can cause a fiery explosion.

Precautions in Using Oxygen

In using oxygen equipment, care must be exercised in opening cylinder valves. It is recognized that when a cylinder valve is opened and oxygen suddenly and at high pressure is "rammed" into the regulator, the temperature within the regulator passages may be instantaneously raised to the kindling point. In the presence of compressed oxygen, metals once kindled burn furiously.

Pipes, tubes, and fittings in oxygen systems should be carefully selected and assembled. Wherever possible, heavy-duty brass, copper, or bronze fittings should be used; iron or steel fittings should be used only when necessary. All parts should be carefully and thoroughly degreased, preferably by the vapor degreasing method.

Threaded joints on systems operating at less than 500 p.s.i. may be sealed with a thread lubricant-sealer, which does not contain mineral, vegetable, or animal oils or fats or other flammable materials.

In systems operating at more than 500 p.s.i. threaded joints should be permanently sealed with a thin paste of litharge and glycerine, and at least 24 hours should be allowed for "setting" of the paste.

Under no circumstances should paint, soap, or other combustible substances be used on either threaded or gasket-sealed joints. Where gaskets are used, they should be dry, free of any trace of oil, wax, or other organic matter, and if possible, the gasket material should be non-combustible.

In assembling pipe threaded fittings care must be exercised to tighten each fitting sufficiently to obtain a tight seal without straining the fittings. The slight taper of pipe threads renders it possible to crack internally threaded parts by excessive tightening. Such cracks may be invisible, but under prolonged stress may open up with explosive results.

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Care Needed in Selecting Cylinders

Oxygen cylinders, valves, connections, regulators, etc., should be selected carefully and with assurance that the parts selected are suitable and safe for use with oxygen. There are large quantities of some of these parts available from the "War Surplus" stores. The prices are very tempting, but these items are not always bargains. The oxygen cylinders made for and used by the Armed Forces were designed primarily for military use under conditions which were so hazardous that it was not expedient or necessary, especially where low weight was essential, to design them to the high safety factor which is used when designing for commercial application. Much of this surplus material has been kicked around in warehouses and in scrap yards since the war. Time, rough handling and the elements have, in many cases, caused metallurgical and mechanical deterioration which renders this equipment definitely unsafe.

Military oxygen equipment was made with both high pressure (1800 p.s.i.) and low pressure (450 p.s.i.) capacity cylinders. In a recent West Coast accident, two men were killed while charging a portable "low pressure" storage cylinder. For them, the cylinder which exploded and took their lives was no bargain.

Before purchasing surplus cylinders, look for the I.C.C. rating which should be stamped just below the neck of the cylinder. A cylinder marked 3A-1800, or 3AA-2015 is thus shown to conform to I.C.C. (Bureau of Explosives) specifications (3A or 3AA) for a working pressure of 1800 to 2015 p.s.i. Also look for a date-stamp, such as "5-45"; these figures indicate the month and the year when the cylinder was tested and certified. I.C.C. regulations require hydrostatic retesting to 1.66 times the working pressure every five years. Do not buy or use cylinders which are badly rusted (inside or out) or which show evidence of having been in or near a fire, unless they are thoroughly cleaned inside and out by sandblasting or *(To page 66)*

THE Future SHOWS

Miami Beach, Fla.

National Society for the Prevention of Blindness Conference, March 26–30. (Floridian Hotel). National Society for the Prevention of Blindness, 1790 Broadway, New York 19, N. Y.

New York, N.Y.

Twentieth Annual Greater New York Safety Convention & Exposition, March 28–31. (Hotel Statler). Paul F. Stricker, Executive Vice-President, Greater New York Safety Council, 60 E. 42nd St., New York 17, N. Y.

Charleston, W. Va.

Annual West Virginia State-Wide Safety Conference, April 5–8. W. C. Easley, managing director, W. Virginia Safety & Health Council, 316–17 Masonic Bldg., Charleston, W. Va.

Columbus, Ohio

Twentieth All Ohio Safety Congress and Exhibit, April 11–13. (Neil House). James H. Fluker, congress chairman; G. S. Kallenbaugh, congress manager, 65 S. Front St., Columbus 15, Ohio.

Buffalo, N. Y.

Tenth Western New York Safety Conference and Exhibit, April 12–13. (Hotel Statler.)

Bridgeport, Conn.

Fifth Annual Connecticut Industrial Safety Conference, April 13. (Stratfield Hotel). Donald Ackley, manager, G. & O. Manufacturing Co., New Haven, Conn.

St. Louis, Mo.

Central States Safety Conference, April 18–20. (Hotel Jefferson). Reyburn Hoffman, Secretary-Manager, Safety Council of Greater St. Louis, 511 Locust St., St. Louis, Mo.

Chicago, Ill.

Thirty-fifth Annual Convention of American Association of Industrial Physicians and Surgeons, April 23–29. (Hotel Sherman). Dr. Edward C. Holmblad, 28 E. Jackson Blvd., Chicago 4, Ill.

Chicago, Ill.

Annual Conference of American Association of Industrial Nurses, April 23–29. (Hotel Sherman). American Association of Industrial Nurses, Inc., Room 909, 654 Madison Ave., New York 21, N. Y.

Toronto, Ont.

Annual Convention International Accident Prevention Associations, April 24–25. (Royal York Hotel). R. B. Morley, General Manager, International Accident Prevention Associations, Toronto 2, Ont.

Chicago, Ill.

Twenty-seventh Annual Midwest Safety Show, May 2–4. (Hotel Sherman). Joseph F. Stech, Manager, Greater Chicago Safety Council, 10 N. Clark St., Chicago 2, Ill.

Pittsburgh, Pa.

Twenty-fifth Annual Western Pennsylvania Safety Engineering Conference, May 2–4. (William Penn Hotel). H. H. Brainerd, Executive Manager, Western Pennsylvania Safety Council, Chamber of Commerce Bldg., Pittsburgh 19, Pa.

Charlotte, N. C.

Twentieth Annual North Carolina Statewide Industrial Safety Conference, May 3–5. (Hotel Charlotte). H. S. Baucom, Safety Director, North Carolina Industrial Commission, Raleigh, N. C.

Baltimore, Md.

Maryland State-Wide Safety-Health Conference and Exhibit, May 4–5. (Lord Baltimore Hotel.) Joseph A. Haller, executive chairman, State Industrial Accident Commission, Equitable Bldg., Baltimore 2, Md.

Detroit, Mich.

Twentieth Annual Michigan Safety Conference and Exhibit, May 15–18. (Book Cadillac Hotel). S. M. Foeller, executive secretary, Michigan Consolidated Gas Co., 415 Clifford, Detroit 26, Mich.

Duluth, Minn.

Twenty-sixth Annual Lake Su-

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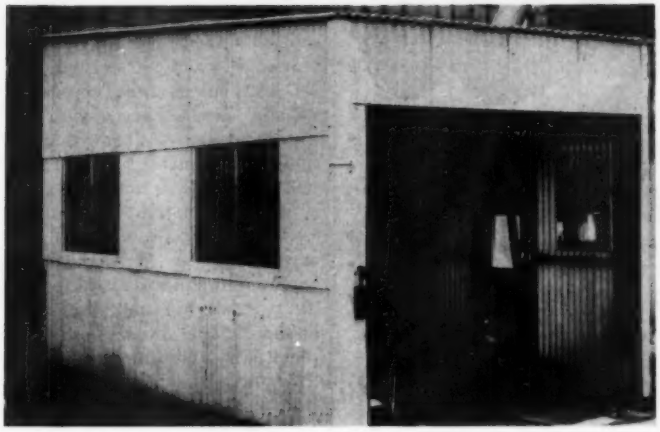

Windows Resist Bumping by Trucks

SHEETS of acrylic plastic are serving a functional purpose as sashless window panes in an extension which the DeLaval Steam Turbine Company recently added to the foundry at its plant in Trenton, N. J. Plant men feared that breakage of glass would become frequent, troublesome and costly because the building's location exposed it to bumps by trucks and materials handling equipment. They wanted also to eliminate easily corroded metal sash and avoid the necessity of keeping it painted.

Accordingly, they took advantage of the plastic's high degree of shatter resistance, its ability to withstand extremes of weather, and its ease of installation. Seven sheets of $\frac{1}{8}$-inch clear corrugated material, each 42 x 60 inches, were installed as three double windows and a single window. Corrugations matched those of the asbestos-cement siding. The plastic was simply bolted to the siding, (using oversize holes because the plastic has a relatively high coefficient of expansion) and caulked with a standard caulking compound. For neat appearance, a narrow strip of asbestos siding was used to cover the lap at the bottom of each window. Clear material, rather than the translucent often used, permits workman to see trucks approaching in a driveway beside the shed.

Acrylic plastic—in this case flat sheets of clear material—was used also to glaze outer doors of the plant, where breakage of glass had risen to a costly rate because doors were often slammed. In this application, maintenance men used $\frac{3}{16}$-inch sheets two feet square.

Picture by courtesy of the Rohm & Haas Company.

perior Mines Safety Council, May 18–19. (Hotel Duluth). John A. Johnson, supervising engineer, U. S. Bureau of Mines, 18 Federal Bldg., Duluth 2, Minn.

Roanoke, Va.

Sixteenth Annual Virginia State-Wide Safety Conference, June 1–3. (Hotel Roanoke). W. W. Myers, managing director, Richmond Safety Council, Allison Bldg., Richmond 19, Va.

Washington, D. C.

President's Conference on Industrial Safety, June 5–7. (Dept. of Labor Auditorium.) Secretary of Labor Maurice J. Tobin, general chairman of the conference.

Boise, Idaho

Western Safety Conference, June 18–20. L. M. McKay, Vice-President, Western Safety Conference, P.O. Box 1038, Boise, Idaho.

Chicago, Ill.

Thirty-eight Annual National Safety Congress and Exposition, October 16–20. (Stevens Hotel). R. L. Forney, general secretary, National Safety Council, 20 N. Wacker Drive, Chicago 6, Ill.

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New Device Protects Coal Miners

A POWER-OPERATED support to guard coal miners from cave-ins resulting from boring or blasting has been invented by Arthur Trow, manager of the New Crosshands Colliery, a British Coal Mine, and Walter Mitchell, a mechanic from the same mine. Named the "Tromit," it is a pneumatic device which simultaneously places supports against the ripping lip and the roof between the last ring and the ripping lip, and also provides head covering for the miners.

The entire operation is effected by remote control. The miner can remain safely under a good steel arch cover, 25 or 30 feet from the ripping lip, and advance or withdraw the frontal and overhead supports by the simple manipulation of one of the two inlet valves on a cylinder. Two of the machines are in use at the New Crosshands Colliery, and another is being tested at Rock Colliery, Glynneath, South Wales.

Left to right: Arthur Trow, Mr. M. Reed, senior fitter, and Mr. Mitchell examine a scale model of the "Tromit" at the New Crosshands Colliery.

Picture by courtesy of British Information Services.

Treat Oxygen with Respect

(From page 63) some other effective method and have been hydrostatically retested. Cylinders showing dents, deep nicks, gouges, or cracks at the neck should not be used, nor should any attempt be made to repair cylinders by welding or brazing.

Yes, oxygen under pressures as high as 2200 p.s.i. can be and has been handled successfully and safely. In our own plant, in the production of oxygen respiratory equipment for aeronautical, medical and other uses, we have handled high pressure oxygen in large volume in individual cylinders and in a piped system for the past seven years.

Despite our successful experience we still handle oxygen with the utmost respect. We know that despite all reasonable practical precautions, accidents can still happen if some unforeseen development creates the proper conditions for an oxygen explosion. We would be far happier if we did not have to handle it at all, but for aeronautical and medical respiratory equipment there is no substitute for oxygen. Therefore, we employ (and suggest that you do likewise) the following brief rule:

"If no other gas will serve your purpose, use oxygen; but use it discriminately, cautiously, respectfully."

Pictures by courtesy of Scott Aviation Corporation.

The Iron Curtain

PRIVATE industry and a relatively obscure arm of American journalism—industrial house organs—are joining in a move to help penetrate the Iron Curtain with truths about American working and living conditions.

The nation-wide campaign to encourage and help industry employees to mail issues of their company publications to English-speaking relatives and friends in other lands was first sponsored by the Philadelphia Industrial Editors Association. George S. Talmage, editor of The Brown Recorder, house organ for Brown Instruments division of Minneapolis-Honeywell, and president of the Association, said "we believe that circulation among working people of other lands of these papers truly reflecting the working and living patterns of Americans can be more effective than any number of speeches by frock-coated diplomats."

ASSOCIATE EDITOR
JACOB A. GOLDBERG, A.M., Ph.D.

Safety Can Modernize Your Medical Program

By R. RALPH BRESLER, M.D., Chief Plant Physician,
Sharp & Dohme, Inc., Philadelphia, Pennsylvania

Industrial medical departments should do more than dispense pills and powders. The active co-operation of the plant physician and the safety engineer can aid production, cut costs and reduce accidents, as well as provide personnel with better medical care.

ANYONE preparing to start or to expand a medical program wonders how he can sell it to management—how to justify the expenditure of the money needed.

There are many ways of tackling such a problem, of course, but, as is basic in good salesmanship, they all involve the use of a certain approach—a particular angle. This article is the story of just such an angle—the story of what this angle did for us at Sharp and Dohme.

Our company for some time has had a medical service similar, probably, to many others in this country. In line with the popular thinking, plant physicians were available to bind up an injured finger, or to hand out an aspirin or a laxative, or to examine a new employee for venereal disease—and that was about it.

The foremen and department managers knew that there was a dispensary—they knew that the Doc was a pretty nice guy—but they felt, for the most part, that minor cuts and scratches were not important and that finishing the job was. There was an unspoken frowning upon requests to go to the dispensary—and this attitude had its effect. The only people who came to the dispensary did so because they couldn't work. The foreman either did or did not follow the plant physician's occasional recommendations, depending upon how he felt at the time.

We had a fatality one day. An apprentice painter fell from a fourteen-foot ladder and cracked his skull. Someone remembered then that this painter was missing two fingers and a thumb from his left hand—his "holding-on" hand—and that perhaps it hadn't been too good an idea to let him climb ladders at all.

The medical records? Sure, it was in the medical records. Most of our people had had pre-employment physicals. Any defects had been carefully noted, carefully entered, and just as carefully buried away in the files.

And that's the way things were up to late in 1945—a medical program of sorts—pre-employment exams (but with no relationship to job placement or to follow-up), power to recommend, but not to enforce; certain facilities for treatment, but few patients.

Does that strike a familiar note? At any rate, that was our situation at Sharp & Dohme just about three years ago, until there was a vacancy caused by the real retirement of our semi-retired Chief Plant Physician.

It would have been very easy for the new physician to slip into this nice comfortable rut. Many industrial physicians have. Yet—somehow—this didn't seem to be real industrial medicine. Management was satisfied, because management had never been shown what

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medicine really can do for industry. Yet—here was management being faced with a young man coming in and trying to upset procedures that had been routine for years. The new physician felt that the whole medical setup was stagnant and obsolete. He complained that the dispensary itself was inadequate and poorly located. He complained that the equipment was old—what there was of it. Yet, to do the things that were indicated—required a selling job to management—a selling job which called for answers in advance that could not tangibly be shown at that time.

Finding the Angle

What was needed, therefore, was a selling point—an angle—a gimmick—and we found it. We found it in our injury rate. We had records, plenty of records—we reported the number of compensable injuries every month—but that's all we ever did about it. No one in the Medical Department had ever heard of a frequency rate or a severity rate—much less done anything about them.

In the solution of our problem, the safety engineer proved to be a valuable ally. For some years, he had worked—practically single-handed—to cut down our accident rate. Management was certainly safety-minded—there was never a murmur when the safety engineer ordered special machine guards, goggles and other types of personal protective equipment. In spite of all this, however, our accident frequency rate was not good.

Here, then, was our gimmick.

Without going into an exhaustive survey of the causes of accidents, it has been shown statistically that less than 20% of industrial accidents are purely mechanical in origin. Such causes include hazardous arrangement of machinery, improper dress, defective equipment, improper machine guarding, and so on. With these, our safety engineer was able to cope. But even at his best, he could control only the 20% of accidents which were of mechanical or environmental origin.

The other 80% resulted from the so-called personal causes—such as improper attitude, physical and mental defects, abnormalities of function, of personality and so on—causes beyond the reach of the safety engineer but directly within the scope of the Medical Department.

Here then, we concentrated our efforts. Basically, both the safety engineer and I felt that our poor rates were the result of a failure of coordination of our efforts. Once we accepted this concept, the next step was clear. We sat down together, and we planned together. We conferred with the employment manager, the training supervisor, the chief engineer, various division directors, foremen—anyone and everyone who had something to offer.

After weeks of conferences and planning, and with no fanfare, we came out with a combined safety-medical program, ostensibly to decrease our injury rate but actually covering a much wider field, and quite far-reaching in its implications.

Physical Examinations

In the Medical Department, our first step was to make more elastic our procedure in administering the entrance physical examination. We no longer adhered to a fixed set of standards for physical qualification of a potential employee. Instead, we considered him in the light of the job for which he was applying. By tempering our knowledge of job requirements with a little common sense, we found that many individuals with handicaps that previously would have barred them from employment could now be placed in jobs where their handicap was of little or no significance.

Under the new procedure, we satisfied ourselves that the individual was able to fill the job safely and efficiently. This, of course, required that each applicant be treated as an individual, not merely as a number, or as a small cog in a large wheel. It involved an appraisal, not only of his physical capacities, but also of his mental ability, temperament, and personality. In other words, we did what we could to fit a round peg into a round hole.

While this procedure added to the burden on the Medical Department, this custom-tailoring of individuals to particular jobs paid off in dividends of

better production, fewer accidents, and improved employee morale.

This custom-tailoring procedure, however, itself brought about one large defect that needed correction. In our plants, as in many others, we follow the procedure of promoting from within, wherever possible. As a result, we had employees originally hired for one job, subsequently promoted to another, with different, and often more demanding physical requirements. Under the old system, promotions were made directly through Personnel, with no reference to the Medical Department. It was primarily because of this procedure that we had our fatality in the summer of 1945—because a man hired as a porter had subsequently been given a promotion to apprentice painter. Physically unfit for work on ladders, he suffered the tragic fall which resulted in his death.

Rating System

In order to prevent such misplacement of personnel, a system of medical ratings was devised to give the employment manager and the supervisor a general picture of the physical capacity of the new employee, without actually revealing specific medical information.

Each new employee-applicant, upon completion of his pre-placement examination, was given a rating of A, B, C, or D.

A rating of D, sparingly given, indicates that the applicant is not eligible for employment with the organization. It is given when the applicant has a communicable or infectious disease, or some other physical or mental condition that would render his employment undesirable, such as severe high blood pressure with kidney involvement, cardiac decompensation, psychoses and so on.

A rating of A indicates an excellent physical and mental status. From a medical standpoint, such employees may be transferred or promoted to almost any job in the plant without further reference to the Medical Department.

Class B individuals are those with minor physical defects which do not interfere with the efficient and safe performance of their assigned jobs. When such employees are recommended for a job change, the Personnel Department informally checks with us prior to making such change. In the Medical Department, an appraisal of the individual's physical condition and medical progress is made from his record, and, if nothing is found to render hazardous his employment in the new job, informal permission for the transfer is given, usually by telephone.

Class C individuals are those with significant defects, who, although qualified for the particular job for which they were hired, must have a careful re-examination before transfer to a new job. It is into this class that our handicapped persons fall—those with markedly limited vision, with loss of fingers or hands, those with significant deafness, and similar defects of a nature which might create serious hazards were their assignment to jobs not watched with an alert and understanding eye. Every Class C employee recommended for a job change must report to the dispensary for examination and a re-evaluation of his capabilities. If he is found qualified for the new job, written authorization for the transfer is issued.

We have found that the rating system, used in conjunction with an elastic set of physical standards, performs a valuable service in preventing the initial assignment, and subsequent transfer, of individuals to jobs for which they are not suited, and in which they become unduly subject to fatigue and resulting injuries.

First Aid

The Medical Department turned its attention to other problems as well. For many years, it had been common practice, although forbidden by unenforced company rules, for employees to give each other first aid in event of minor injuries. An individual would use the corner of a dirty handkerchief to remove a foreign body from the eye of his fellow worker, or would bind cuts with a rag—and the affected worker —(usually by then also infected)—would return to work without bothering to report to the dispensary for proper medical attention. Almost every department had its own secret little supply of stale hydrogen

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peroxide and completely unsterile band aids. Small wonder, then, that this type of treatment frequently resulted in severe infections, with subsequent disability and lost time.

This was changed. A campaign of publicity and education was undertaken to impress upon all employees the fact that for any injury, no matter how small, they were to report at once to the plant dispensary. In presenting the picture to the employees, we hammered at two main points—first, the danger to their health resulting from inadequate amateur treatment, and secondly, the danger to their pocketbook, since the absence of an official record of the injury might prejudice their rights to receive the benefits of Workmen's Compensation.

This policy was easily sold to the members of management, since it was perfectly clear that prompt and proper treatment prevented infections, decreased the incidence of complications, cut down tremendously on time lost from the job, and therefore minimized interference with production and saved money!

On the same basis, we sold the department managers and foremen. Management formalized this policy, at our request, by making the department managers and foremen directly responsible for seeing that every injured workman reported promptly to the dispensary for treatment of any injury. This policy is in full force at all of our laboratories—and it's here to stay.

We also turned a critical eye on our own bailiwick. For some reason, in the past, our physicians had been reluctant to do any suture work. Employees coming in with small or moderate injuries were bandaged and shipped to a hospital or to a surgical consultant. In many respects, our dispensary had become merely a clearinghouse—a place solely for determining where to send a patient for treatment. Such excessive and unnecessary use of hospitals and consultants placed an additional burden on the compensation insurance for which we were already paying high premiums—much to management's annoyance.

We applied a new concept—new to Sharp & Dohme, at least—the idea that the industrial dispensary must be so equipped as to be able to care for all but grave or complicated surgical cases—limited only by the skill and experience of the plant physician. We did not set up an elaborate operating room or make provision to do amputations or complicated tendon or nerve surgery. We did purchase additional instruments, and set up a sterile technique that enabled us to care for at least 80% of cases that had previously been sent out. This alone resulted in a gratifying drop in the company's insurance premium.

This procedure of treatment in the plant had other aspects, as well! Those companies having large numbers of women among your employees are constantly troubled with the problem of dysmenorrhea—periodic cramps and discomfort. Formerly, at such times, our girls were sent home to bed—disrupting routine company procedures and, at times, creating a serious problem on the production lines. We found more practicable a system of administering treatment in the dispensary—one of our own medications, by the way—then allowing these girls to rest in bed for an hour or so with a heating pad. Within a relatively short time, they felt better and were able to return to the job. This one simple change cut down markedly on this type of absence from the job.

We made other changes in the dispensary. We added a few new things—frills, if you like—but things which added to employee comfort, and improved their morale. One such frill was our suction-pressure machine—an impressive-looking apparatus which we use for spraying noses and throats. In so doing, we had no idea of competing with family physicians. We treated only cases for which the average worker would not ordinarily have gone to a physician anyhow. We would get a worker with a simple head cold—his nose blocked up—who was spending almost all of his energy simply trying to breathe! A quick nose and throat treatment—and he returns to work with a clear head—able to do his job properly and without strain.

Plant Inspections

All these things helped to create among the employees the idea that the dispensary was the place to go when they had troubles, and we did our best to help in every way we could.

We made another drastic and very basic change in policy. The caterpillar emerged from his cocoon!! The plant physician no longer sat in his comfortable chair in the dispensary, while the mysterious wheels of industry ground on around him. Instead, he started on plant tours—the better to understand those wheels. We felt that it was impossible to judge a man's fitness for a job unless the physician himself understood everything there was to know about that particular job. We made it a regular routine to prowl about the plant, watching men and machines, learning procedures—asking questions. In so doing, we not only became familiar, at firsthand, with plant problems—but also became personally acquainted with the supervisors and foremen—and many of the workers individually. We looked into the problem of rest rooms and toilets—inspected them frequently to make sure that they were clean and well supplied. We checked into problems of ventilation, and lighting—conditions of eyestrain, unusual fatigue, or unusual health hazards. We uncovered many such conditions—conditions that had existed for years—conditions which had never been corrected simply because no one had ever been interested before.

For example—for a long time, certain of the girls on the pharmaceutical packaging line had complained of backaches. As a matter of routine, they had been given some medication and perhaps a heat treatment—and were then sent back to work. Those cases who complained severely were sent home. This resulted in an unusually high absentee rate for this group—yet nothing was done about it.

Simple inspection of the production line showed that each of these girls was seated on the same kind of fixed-type stool. It was immediately apparent that the very tall girls towered over the work table and had to bend over to do their work. The very short girls, on the other hand, had to stretch to do their work properly. The medical records bore this out—since it was found that these backaches were occurring in those girls who were other than average height.

The line was furnished with a new type of posture chair—with adjustable backrest—and a seat adjustable for height. Each girl was then able to adjust her chair to a comfortable working position. The backaches stopped. Simple? Of course it was simple. Yet no one had taken the trouble to look into the matter before.

In the course of these plant tours, the physician became an integral part of the safety committee. He made routine inspections with the members of the committee—and in this way, further increased his knowledge of plant hazards.

Other Innovations

As a part of our accident prevention program, we developed a special medical form for accident investigation—originating, as it should, with the plant physician. It ties together the three logical agencies most directly concerned with accident prevention and accident investigation: the foreman, the safety engineer, and the plant physician.

A very important policy on which we insisted was that medical information was to be regarded as strictly confidential—and that such information should remain within the Medical Department. We felt that only in this way could the proper physician-patient relationship be maintained. It was primarily for this reason that we adopted the physical rating system mentioned before.

With the safety engineer, we made a part of our regular routine a weekly meeting, attended by all employees hired during that week. At the meeting, the new people are given a thorough indoctrination in company accident prevention policies—and to each worker is explained his responsibility for safe plant operation. Our Chief Nurse then discusses the Medical Department, its functions and policies, and particularly stresses the necessity for reporting promptly to the dispensary for the treatment of minor

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injuries. We then hold open forum for answering any questions that arise.

As for some of the tangible results of this program, the chart (Fig. 1) shows what happened after the program went into effect in the early part of 1946. As you can see, the frequency of our industrial injuries made a dramatic drop. From our previous all-time record of 32 consecutive days without a disabling injury, our main laboratories went 236 days—almost one and a half million consecutive man-hours—without such an injury—and our rate has been low ever since. Our improved accident record has won recognition from the National Safety Council on numerous occasions.

It may be pointed out that the frequency rate does not present a complete picture, since it includes only the number of disabling injuries without indicating their severity. This factor is measured by the so-called "severity rate"—the number of man-days lost per thousand man-hours worked. In Figure 2 is outlined both the frequency and severity rates for the period 1944–48, including the rates for the last two years under the old program and the first three years under the new. Not only has the frequency rate shown a marked improvement but the severity rate has decreased with it.

Fig. 2. Frequency and Severity Rates for Main Laboratory.

		Frequency Rate	Severity Rate
Old Program	1944	21.8	0.15
	1945	23.7	0.12
New Program	1946	4.6	0.03
	1947	2.6	0.07
	1948	1.39	0.03

These figures are only one means of pointing out to management that a modern active medical program will save the company money. Fewer injuries mean fewer hospital bills, fewer surgeon's bills and less workmen's compensation to be paid—therefore lower insurance premiums!

It is an equally obvious fact that better medical selection of personnel—the fitting of individuals to particular jobs—will increase production and decrease absenteeism—again a potent factor in saving the company money.

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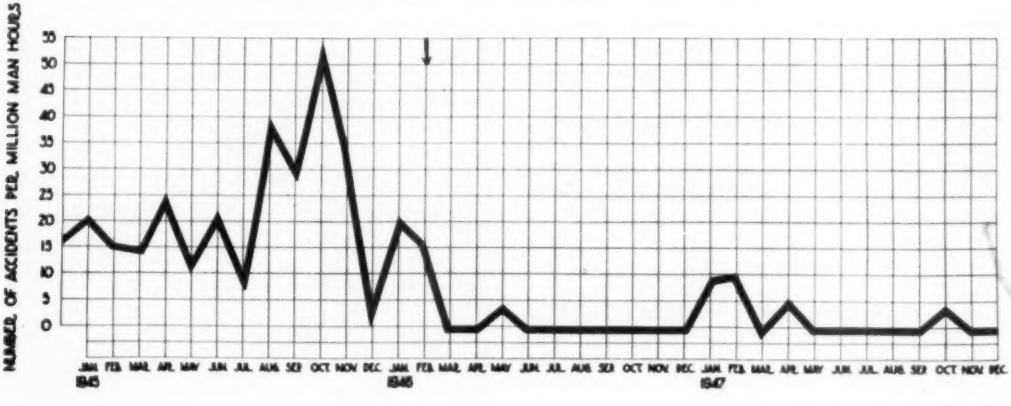

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AL SAFETY DATA SHEET SD-36, EN SULFIDE, may be obtained at 20c per the Manufacturing Chemists' Association, ard Building, Washington 5, D. C. Re- ould be sent with each order.

strial Medicine Bibliography

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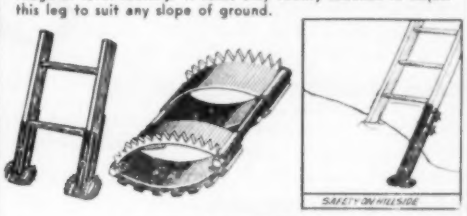
It is intended to issue future numbers of the Bibliography on a quarterly basis. The price of the 1948 volume is $1.00. Future issues will be available on subscription at $1.00 a year.

Free Bulletins & Catalogs

See page 79

New Invention Makes Ladders Safe

Saves Time Looking for Makeshift Wedges to even ladder. With a Safety Ladder Leg anyone can adjust ladders to be safe and sure on any type of footing. Safety Ladder Leg slips on any standard ladder in seconds. Once attached there is no need taking it off regardless of whether you are working on rough or level footing. It takes only twenty seconds to adjust this leg to suit any slope of ground.



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Benzol & Carbon Tet. Labels in Massachusetts

COMMISSIONER John J. Del Monte of the Massachusetts Department of Labor & Industries has announced the promulgation of rules and regulations relative to the labelling of receptacles containing benzol and carbon tetrachloride effective January 1, 1950. Copies of the rules and regulations may be obtained from the Division of Industrial Safety, Massachusetts Department of Labor & Industries, 473, State House, Boston.

These rules and regulations require that receptacles holding benzol or carbon tetrachloride, or mixtures containing these substances in amounts greater than 1%, must be labelled if they are used, sold, or stored in Massachusetts. The required marking differs in some respects from that agreed upon by the Manufacturing Chemists' Association and the Surgeon General of the U. S. Public Health Service. Labels to be considered satisfactory in Massachusetts must comply with the rules and regulations developed by the Department of Labor & Industries.

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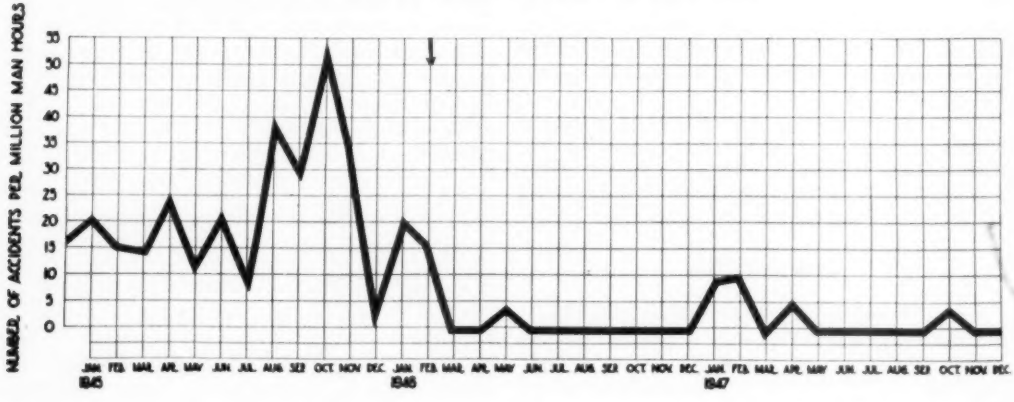

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CHEMICAL SAFETY DATA SHEET SD-36, HYDROGEN SULFIDE, may be obtained at 20c per copy from the Manufacturing Chemists' Association, 246 Woodward Building, Washington 5, D. C. Remittance should be sent with each order.

Industrial Medicine Bibliography

UNDER the title "Bibliography of Occupational Medicine" the International Labor Office is resuming publication of its international index of references to major books and articles dealing with all aspects of industrial health and welfare.

The current volume covers the year 1948. The subjects are classified under such general headings as occupational medicine, medicine of accidents, industrial hygiene, social medicine and hygiene, rehabilitation, social insurance, analytical methods, laboratory toxicological studies. It includes an author index and a subject index.

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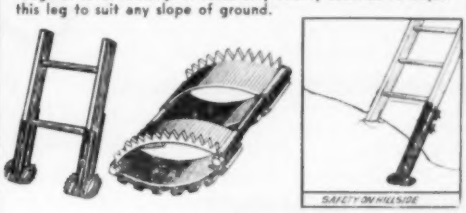

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See page 79

THE INDUSTRIAL Nurse

EDITOR

ROSAMOND J. WEBSTER, R.N., A.M., Ph.D.

Fatigue & Nervousness

SOME reports indicate that one-third or more of all patients who seek medical help have as the most significant cause of ill-health an emotional or neurotic disturbance. Fatigue and nervousness are the commonest symptoms of these disturbances. The diagnosis of these conditions, like that of all other complaints, must be made on the basis of positive evidence, supported by characteristic symptoms. Jumping at conclusions and providing medication before a physician has made his examination and has prescribed therapy are both to be avoided. In general, those who complain of simple tension and fatigue states require questioning as to personal habits, home conditions, regularity of previous employment, previous medical and surgical treatment. With the considerable regularity of employment and health and safety measures, it may be presumed that the few who come to the industrial nurse with the indicated complaints warrant further study. Those who give evidence of constitutional inadequacy, pronounced emotional disturbances, or prolonged economic and environmental problems, present distinct therapy challenges. Many can be helped by restricted work, prolonged rest, and effective advice and assistance with family and other personal problems. The industrial nurse may not always be prepared to deal with such problems. She may have to call upon her superiors and various communal resources for advice and assistance in specific cases.

Inculcating a Concept

THE belief has become prevalent among many faculty members of our medical schools that since the medical student is a potential practitioner—general or specialist—he must be inculcated with certain fundamental concepts. Among these is the one that stresses man as a person, and not just a patient with a cancer, duodenal ulcer, heart disease or some other ailment. These pathological and other conditions are incidental to the whole man and total personality. It is then necessary to learn how the individual adjusts himself to his physical as well as emotional environment. To achieve these objectives on the medical school level, one such institution of learning now offers, in addition to courses in sociology and psychology as applied to medicine, practical training and field work in these areas. Many schools of nursing have assigned students to social service departments, have affiliated their students with visiting nurse associations, and have regularly established contacts with public and voluntary health and welfare organizations. The Curriculum Guide for Schools of Nursing recommends teaching and experience in parallel areas. However, there is not always sufficient realization on the part of industrial nurses and their superiors and associates of the many opportunities for service available to ailing and injured workers aside from the company first-aid room and local hospitals. An analysis of local facilities coupled with conferences with leaders in health and welfare agencies might lead to some interesting and useful developments.

Victory and Its Aftermath

IN 1900 life expectancy in the United States was approximately 47 years. Fifty years later, it is about 67 years, a gain of 20 years. This has been the era of greatest gains in medical and related sciences and the end results are evident in the figures quoted. The advances of knowledge in bacteriology alone and the application of this understanding to the environment so that contact with pathogenic organisms is avoided are in large measure responsible for the phenomenon. To this must of course be added the development and utilization of the antibiotics, which are rapidly changing the health picture in so far as pneumonia, syphilis, gonorrhea, and a number of other serious infections are concerned. Happily, we are only in the beginning stage, and the future promises even greater advances in the prevention of disease, the cure

of disabilities, and the promotion of health. These magnificent accomplishments to date have advanced the life span as well as the survival rate. However, certain new and urgent problems have been created. The rapidly rising incidence and social burden of chronic, progressively disabling disorders associated with senescence are among the major social problems of the present and immediate future. As our population ages, on the average more men and women attain the age levels in which cancer, diseases of the heart and kidneys, and other disabilities become prevalent. Perhaps the best that can be generally offered as a service at present is early diagnosis of curable conditions or those which can be ameliorated. In this area the industrial nurse can be of much help to those with whom she works. Other areas must await the researches of laboratories and hospitals, many of them heavily financed by far-seeing industry.

Preventing Repeaters

THE famed Dr. (Sir) William Osler once commented on the considerable number of patients discharged from the Johns Hopkins Hospital outpatient department, who, having failed to follow the instructions given them, returned after a short time with a recurrence of their initial difficulty. This, noted Dr. Osler, might have been avoided if the physician and nurse had carefully explained the condition, interpreted the recommendations for treatment, and arranged for follow-up work in the home to check on the patients. Often they did not understand the medical terms nor the "fancy" language used by the physician and nurse. Perhaps similar failings occur in some plant first-aid rooms, especially when the ailing or injured worker happens to be foreign born and with a poor command of English, or when he is slow-witted or has had but little schooling. Dr. Cabot, working in the Massachusetts General Hospital in Boston, has found the same situation prevalent as did Dr. Osler. They were both outstanding teachers and physicians. These men and their observations led to the establishment of social service departments in hospitals. At present virtually no hospital of standing is without such a department and a well trained staff of workers. Now, if individual clinic repeaters are to be prevented in industrial medical departments, the nurses must do the explaining, must carry out the necessary education and perform certain follow-up tasks which are within her scheme of responsibilities. These may vary with individual plants and communities. But the fundamental responsibility is evident.

What Is Morale?

MUCH emphasis is placed on the desirability of developing a fine morale among workers. The term often is not thoroughly understood. It is assumed to mean various things—loyalty, willingness to put in an honest day's work for a full day's pay, concern about the employer's problems, and many others. The following are definitions of the term in psychological terms: (1) The term morale refers to a condition of physical and emotional well-being in the individual that makes it possible for him to work and live hopefully and effectively, feeling that he shares the basic purposes of the groups of which he is a member, and that makes it possible for him to perform his tasks with energy, enthusiasm, and self-discipline, sustained by a conviction that, in spite of obstacles and conflict, his personal and social ideals are worth pursuing; (2) Morale refers to the condition of a group where there are clear and fixed group goals (purposes) that are felt to be important and integrated with individual goals; where there is confidence in the attainment of these goals, and confidence in the means of attainment, in the leaders, associates, and finally in oneself; (3) Given a certain task to be accomplished by the group, morale pertains to all factors in the individual's life that bring about a hopeful and energetic participation on his part so that his efforts enhance the effectiveness of the group in accomplishing the task at hand.

Ailments and Affection

THOSE who have been close to ailing men and women, particularly nurses, have long recognized the hunger for understanding evidenced by the seriously ill. In England a well known psychiatrist has taken occasion to emphasize this fact. Medical men in this country have commented on this phenomenon in medical journals on various occasions. The psychiatrist from abroad holds that chronically ailing patients show an inordinate need for affection. This may be an indication of the morbid personality, for instance, of patients with tuberculosis. Coupled with the need for affection are various personal conflicts over the state of dependence. Perhaps the outstanding aid that such patients can be given lies in helping them to a clear realization of the physical condition and the circumstances that led up to it. In this way it may help to create a state of mind which will make it easier to face the ordinary hazards of life, and the particular situation involved in the current illness. This approach often helps in the restoration of health and enrichment of the patients' personality, with a development of maturity towards all problems that are being faced. It is, of course, correct to interpret these comments in the light of the needs of seriously ailing patients. But those who come with their minor complaints may be in need of similar consideration. The badly infected hand, the abdominal pain, the pain in the area of the heart, pains in the neck and head may render many fearful of serious consequences. Proper and considered personal relationships between the industrial nurse and these workers can do a lot to help them over rough times and fearsome events in their lives.

NEW PRODUCTS

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TO SERVICE DEPT., SAFETY ENGINEERING MAGAZINE

SELF-PROPELLED SCRUBBER

A SELF-PROPELLED Combination Scrubber-Vac, #418P, for small-area buildings has been announced by Finnell System, Inc., originators of power scrubbing equipment. The new model, designed for floor areas ranging from 2,000 to 15,000 sq. ft., has an 18" brush ring.

Like Finnell's larger combination machines, the #418P applies the cleanser, scrubs, rinses, and picks up—all in a single operation. It produces clean floors in about one-third the time required by a conventional 15" or 18" polisher-scrubber using separate equipment for pickup, etc.

The new Scrubber-Vac handles both wet and dry work. It includes all the refinements developed by Finnell for its combination machines. The units can be leased or purchased. For complete details, send in the convenient coupon.

SAFETY LENSES & GOGGLES

A COMPLETE line of safety lenses and plates, safety goggles, and cover lenses and plates are available for immediate delivery from the Modern Glass Processing Corp. of Brooklyn. This company makes all the items in its own plant, which is equipped with the latest scientific apparatus for testing, grinding and hardening.

The SAFE-T-WELD glass and filter plates (Shades 8–14, Federal Spec.) have been developed through many years of research to eliminate both the ultra-violet and infra-red rays present in acetylene and arc welding. Accurate grading for density and size is in strict accordance with the U. S. Bureau of Standards.

SAFE-T-WELD filter lenses are carefully matched by pairs in thickness and color. They are ground and polished with great precision and are checked for scratches, striae and any other defects. All processing, from raw glass to finished product, is carried out in one plant. These filter lenses are available in shades 1–8, Federal Spec., and are guaranteed against defects of any kind.

SAFE-T-HARD glass lenses are supertempered against impact hazards for maximum eye protection. They exceed Federal Specifications in resistance during drop ball tests. Also available are industrial safety spectacles with clear or filter lenses and with wire screen or green acetate side shields. For complete details, send in the coupon.

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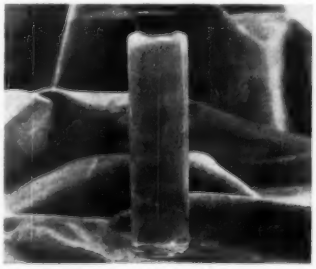
NOW you can get rid of that dirt and grime the quick easy way with a new cleaner in liquid form. Called "Knoxall Concentrate," it is the most recent development of the Knoxall Corp. of Indiana. The cleaner combines the best features of a soap and the best features of a synthetic, and because of its liquid form, combines instantly with water. Furthermore, it leaves no undissolved concentrate to be wasted.

The excellent detergent qualities of this new cleaner make it a labor saver for general maintenance in institutions, factories, schools, offices, etc. Cleaning is easier and the hours of manual labor are reduced. One of its most important characteristics is its ability to break the hardest water quickly, permitting full and immediate benefit of its detergent action. The cleaner is not injurious to surfaces and is not affected by sub-zero temperatures.

With all these advantages, the Knoxall Concentrate also packs eye appeal with its transparent, red color. It is not only an unusually effective cleaner, but also one which is easy and pleasant to use. For further details, send in the coupon.



NEW CARBON DIOXIDE EXTINGUISHERS

DEVIATING from its standard 4 and 5 pound sizes, Randolph Laboratories, Inc., of Illinois, has produced a new, portable six-pound carbon dioxide fire extinguisher with 20% additional fire-fighting capacity.

Randolph "6" is a compact, lightweight unit, featuring thumb-trigger release and self-aimed nozzle. Only one hand is required to operate this CO_2 extinguisher, from the instant it is removed from its bracket, until the flames are extinguished. With no valves or nozzles to adjust, the new "6" is completely panic proof.

The extinguisher contains six pounds of non-toxic, non-damaging carbon dioxide gas, and is especially adapted to smother flammable liquid and electrical fires. The "6" is approved by the Underwriters' Laboratories, and in Underwriters' official tests, it extinguished a 16 square foot gasoline fire in 7½ seconds.

NON-SLIP COATED GLOVES

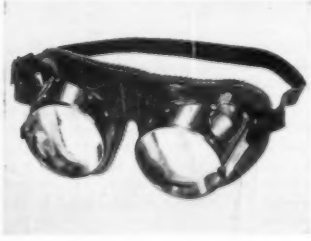
THE development of a highly wear-resistant, non-slip finish for its Sureseal PK Coated Fabric Work Gloves has just been announced by the Surety Rubber Company of Ohio. The company has succeeded in applying its exclusive Griptite Finish to the coating on these gloves. This gives the Sureseal PK Gloves effective gripping action in liquids, including lubricants, but without causing injury to metals or machinery.

The new finish also adds greatly to the wearing qualities of these coated gloves, which were already well known for their long wear and resistance to abrasion. They are efficient and economical for all types of handling operations including heavy metal pieces. The Sureseal PK Coating will not crack or peel, and has unusually high resistance to chemicals. The new Griptite Finish is cured into the coating and lasts as long as the gloves. Available styles include knit wrist, band top, safety cuff, and gauntlet types—most of them with or without ventilated back. All styles are molded to a comfortable curved finger design. For complete details, send in the coupon.

NEW EYECUP GOGGLES

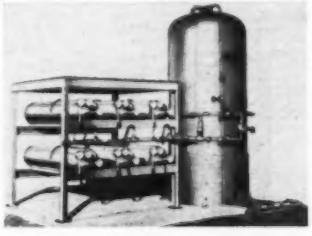
ANYONE employed in hot, dusty jobs will find comfortable, lightweight protection in this improved leather mask goggle. Manufactured by Willson Products, Inc., Reading, Pa., it has special comfort features to induce workers to wear it, rather than risk injuring their eyes.

The goggle mask is made of high grade, pliable leather, which absorbs and distributes impact shock. The one-piece elastic headband is quickly adjustable, and makes the goggle practical for any face or head size.



Two styles are available to insure complete protection for various occupations. Style DL31, designed for hot jobs, has deep, well-perforated eye cups to permit air circulation and reduce fogging. Edges are corduroy fabric-bound to absorb perspiration. These qualities make the goggle suitable for operations where heat is intense and maximum ventilation is desirable.

Style DL48 is indirectly ventilated with two baffled and screened ports on each eye cup, and is used especially for dusty jobs. Indirect ventilation permits free air circulation, but excludes dust, grit, and other flying particles. Both models have impact-resistant Super-Tough lenses and have been designed to provide workers with the greatest amount of comfort consistent with safety. Send in the coupon for complete details.



DRY CHEMICAL FIRE SYSTEM

WITH the introduction of its large stationary fire fighting units, Ansul Chemical Company has made another important addition to the rapidly expanding field of dry chemical fire protection. These units are being built in 500 lb., 1,000 lb., and 2,000 lb. capacities. They are designed to protect wide areas where a minimum of manpower is available—such as gasoline bulk plants, gasoline storage areas, refineries, railroad yards, petroleum and natural gas fields, large chemical plants, liquefied petroleum gas tank farms and other major public utility hazards.

In industries where only one employee, such as a night watchman, is available for emergency fire duty, he can operate the Ansul stationary unit and fight a fire in any portion of an area several acres in size.

The stationary unit itself consists of a centrally located steel tank containing dry chemical and nitrogen cylinders (used to pressurize the tank). Piping runs underground from the tank to one or more hose houses where one-inch chemical engine hose is coiled. Hose may be obtained in 50, 100 and 150 foot lengths.

Rate of flow of dry chemical is 450 lb. per minute. Recoil, a problem with this high rate of discharge, has been minimized by a specially designed nozzle. Effective range is about 35 feet.

The 500 lb. unit is equipped with a 365 cu. ft. nitrogen cylinder. The 1,000 lb. model is pressurized by two of these cylinders, the 2,000 lb. unit by four. Number of hose houses and piping outlets are determined by each customer's needs. For details, use the convenient coupon.

COLD PREVENTIVE

EVERYONE should be aware by now of the use of antihistaminics to overcome colds. The Bristol-Myers Company has designed a special RESISTAB package for use exclusively in industrial clinics. The package contains 500 tablets, each individually sealed in long strips of transparent, foil-backed tape. By tearing off the desired number of tablets, no dispensing envelope is required, and the method is more convenient than counting out tablets from a bottle.

Each RESISTAB contains 25 mg. of thonzylamine. Workers should be warned to stay away from machinery if they feel drowsy, but the manufacturer states that this antihistamine is remarkably free from toxic side-effects. The industrial package is obtainable only on direct order from the professional department. For full details of the scientific background, directions for use, and a sample, send in the coupon.

LUMINESCENT STRIPING

DESIGNED for employees whose job entails working in dimly lighted areas or on highways with no illumination, the Milburn Company has announced that all styles of their Ply-Garb protective clothing can now be had with luminescent striping to reflect the light of approaching vehicles or moving equipment.

This improvement should be welcomed by many whose work entails the additional hazard of moving vehicles in areas of low visibility. Utility company employees, railroad yardmen, police and fire departments whose emergency work often is done at night should find this feature of great importance.

For further information, send in the coupon.

INTERCHANGEABLE FILTER RESPIRATOR

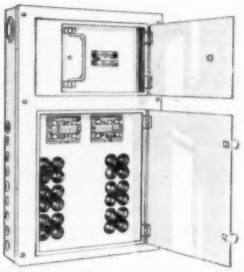
A NEW line of twin cartridge respirators specifically developed to provide protection for the first time against seven respiratory hazards through a basic face piece and seven interchangeable filters is announced by American Optical Company.

The new development gives a user seven respirators in one through the seven interchangeable filters which can be quickly screwed into the respirator's twin filter holders. This feature eliminates the expense of stocking seven types of respirators for those who need protection against respiratory hazards commonly encountered in industry. The new respirators will be distributed with one or more pairs of filters, depending upon the needs of the user.

The basic face piece of the new respirators is molded from durable rubber and has a new "rolled" edge that curves inward to give a snug fit without leakage. Other features include a new flexible fitting brace for shaping the respirators to individual features, a highly efficient inhalation and exhalation system and increased field of vision through thinner filter cartridges.

The seven filters developed for the respirators provide protection against the following: 1. A combination of all dusts —toxic, pneumoconiosis-producing, and nuisance dusts as small as 24 millionths of an inch. 2. Low concentrations of light organic vapors and gases met with in paint spraying, degreasing, dry cleaning, cementing, and similar operations. 3. Low concentrations of acid gases and mists such as sulphuric acid, hydrogen chloride and acetic acid. 4. Low concentrations of combined acid and organic gases like halogenated hydrocarbons, aniline and hydrogen chloride. 5. Low or nuisance concentrations of ammonia only. 6. Low concentrations of organic vapors and all dusts when present simultaneously. 7. Fumes produced in welding, burning, smelting or refining operations, or in any operation in which metals are heated to high temperatures.

For complete details use the convenient coupon.



FUSIBLE SERVICE EQUIPMENT

THE Wadsworth Electric Mfg. Co. has developed and placed on the market a new 200-ampere Fusible Service Equipment to meet the electrical needs for lighting, heating, range and water-heater circuits. All the service control units are contained in one cabinet for surface or flush mounting. The cabinet is finished with a durable baked enamel and is equipped with the necessary fuse circuits and pressure wire connectors. For details, send in the coupon.

LOAD BINDER

AN INSTRUMENT of wide general appeal in heavy industries is the Nolan Load Binder and Puller-Jack, announced by The Nolan Company of Ohio.

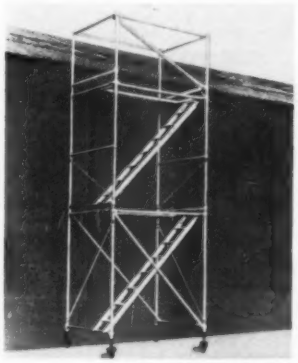
Difficult moving jobs and load binding can be accomplished quickly and safely, by one man, with this useful, efficient tool. The Nolan Load Binder and Puller-Jack can be quickly set up and used in any position—upright, sideways, or upside down, with lever pull away from load or toward it. The mechanism will not clog with dirt, gives positive action, and always holds. A feature claimed by the manufacturer is that it is the only puller that pulls for the entire chain length at one hold.

Two models are available, with capacities up to 5 tons. Complete information and prices can be secured by sending in the coupon.

ROLLING SCAFFOLD

A NEW sectional-type Aluminum Rolling Scaffold is announced by The Patent Scaffolding Co., Inc., manufacturers of Gold Medal Scaffolding and other safety-off-the-ground equipment. Light, easy to erect and neat in appearance, the Aluminum Scaffold is ideal for many types of overhead and sidewall work such as painting, cleaning, church and office building maintenance and installing and repairing lighting fixtures.

The Scaffold is offered in two types—stairway type (illustrated here) and ladder type. All parts of both types, except casters and platforms, are made of light, durable aluminum alloy. Scaffolds are supplied in one or more sections, with guard rails. The bottom section, including non-elevating casters, is 7′ 3″ from ground to first platform. Each additional section is 6′ 8″ high. Base dimensions are 4′ 6″ x 6′. Two types of 5″ steel casters are available—a non-elevating type and an adjustable type with a steel screw providing additional height.



Frames for intermediate sections slip over a sprocket in the lower section. This joint is secured by a hinged pin for extra safety. A novel spring lock is used to secure horizontal members quickly and safely. For further details, send in the coupon.

March, 1950

To SAFETY ENGINEERING

75 Fulton St., New York 7, N. Y.

For prices and complete details of items mentioned in this month's "What's New in Safety Products," check items that interest you and mail coupon.

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- ☐ Safety Lenses & Goggles
- ☐ Liquid Cleaner
- ☐ New Fire Extinguisher
- ☐ Non-Slip Coated Gloves
- ☐ Eyecup Goggles
- ☐ Dry Chemical Fire System
- ☐ Cold Preventive
- ☐ Luminescent Striping
- ☐ Filter Respirator
- ☐ Fusible Service Equipment
- ☐ Load Binder
- ☐ Rolling Scaffold

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LIGHTING & ELECTRICAL EQUIPMENT

Outdoor Lighting for Industrial Plants . . . 1
General Electric Co. The foreword to this unusually well-planned 16-page pamphlet points out that good outdoor plant lighting aids materials handling, safety, and protection against unlawful entry. With a non-technical text, excellent diagrams, pictures and charts, the pamphlet covers such important phases of lighting as: typical applications, property-line lighting, area lighting (including roadways, loading platforms, parking, construction, and emergency lighting), lighting equipment and the lighting circuit. Also included is a valuable Equipment Selector Chart, showing the types of equipment suitable for various areas and types of lighting.

Reels for Electric Cords . . . 2
Benjamin Electric Co. This illustrated 2-page folder describes in detail the various types of automatic reels for electric cords. They are designed for mounting in any position, with uniform tension on the cord. The "level winder" attachment distributes the cord evenly in the housing and tends to wipe dirt, oil and moisture from the cord. Among the models shown are those for connection to tools as well as those for extension lights.

PERSONAL PROTECTION

Everything in Safety . . . 3
General Scientific Equipment Co. The 1950 issue of this company's "Everything in Safety," a catalog of personal protective equipment and industrial safety devices, has just been released. This new 46-page catalog covers respiratory devices, eye protection, hats, gloves, carboy pumps, drum pumps and miscellaneous safety equipment for use in factories, mines, utilities and farms. It is fully illustrated and includes a price list.

GUARDS AND TOOLS

Power Press Guard . . . 4
Jamestown Safety Guard Corp. A 4-page illustrated folder gives full details on the new Anderson Safety Guard. A plastic shield attached to a metal arm moves into position in front of the ram when the foot pedal is operated. The press will not trip until the guard is in position, and the guard stays in position until the dies have reopened and the foot pedal positively released. If the press "repeats," the guard is ram-operated. Removal of the guard shuts off the power. Plastic shield permits full visibility and positive hand protection.

Automatic Centering Reels . . . 5
F. J. Littell Machine Co. Automatic centering stock reels are described in a new 2-color, 4-page circular. The reels, which are for holding coils of from 300 to 6,000 lbs., are available in both plain and motor-driven types. The illustrated folder points out that the automatic centering mechanism enables the machine operator to load a new coil or change to a new coil very easily.

Feed-O-Matic Press Feeder . . . 6
The V & O Press Co. This 4-page bulletin describes and illustrates the automatic feed for punch press production on secondary die operations. This dial feed has a mechanical hand which brings each blank into correct position and trips the press. The operator's hands are never near the danger zone. The bulletin gives full details on the equipment's construction, how it increases die life and how it can be easily reset for new operations.

Machine-Attached Eye Shield . . . 7
Junkin Safety Appliance Co. This 4-page folder describes a unique type of illuminated eye shield for grinding and snagging operations. The glass shield protects the eyes and face from sparks, chips and dust. It is mounted so that neither the light nor the power for the grinding wheel will be on unless the shield is correctly and safely positioned to protect the operator.

Rail Clamp & Hopper Car Wrench . . . 8
Safety First Supply Co. A one-page bulletin describes and illustrates clearly two tools to be used for railroad cars. The first is a rail clamp as a safety stop for car ferries, loading platforms, sidings, traveling cranes, freight cars, steam shovels, etc. The second is a safety friction wrench for dumping and winding up pockets of hopper cars. The friction mechanism prevents the handle from springing up to injure the operator.

MATERIALS HANDLING EQUIPMENT

Portable Elevating Tables . . . 9
The Hamilton Tool Co. A 4-page, illustrated bulletin describing numerous types of portable elevators, elevating tables and conveyors. This bulletin should be of value to all those faced with the problem of lifting and transporting heavy tools or materials, and also those interested in the modern technique of stock positioning as a means of reducing industrial injuries and cutting production costs.

Fork Lift Trucks . . . 10
Clark Equipment Co. An unusually interesting bulletin offers six stories about overhead materials-handling problems and how fork lift trucks have solved them. These include a 28,000-lb. shipment of winches by plane, electrical equipment storage, textile bale handling, bottling plant storage, warehouse operations, and palletized food storage.

Aluminum Rolling Scaffolds . . . 11
The Patent Scaffolding Co., Inc. A 2-page illustrated bulletin shows both the ladder type and the stairway type of aluminum rolling scaffold. The folder stresses the six advantages of these maintenance and repair platforms: light weight, ease of erection, safety, compactness, versatility, and resistance to corrosion. Easily disassembled for storage or transportation, the scaffolds are ideal for overhead and sidewalk work such as painting, cleaning, machinery assembly and repair, etc.

FLOORING & MAINTENANCE

Damp-Sweep Tool . . . 12
Walter G. Legge Co., Inc. This 6-page folder describes and illustrates the Legge Damp-Sweep Tool for the scientific technique of floor cleaning. The booklet points out that after ordinary sweeping an office floor is still well loaded with dust and grime. The damp-sweep tool makes floors cleaner with less effort by using a washable cleaning cloth over a brush.

Iron-Aggregate Concrete Floors . . . 13
Master Builders Co. A new 36-page illustrated booklet gives full information on the Masterplate Iron-Clad Concrete Floor, including the nine features most important in industrial, commercial and institutional floors. The iron-aggregate surface coating provides greater wear, is spark resistant, static disseminating, non-dusting, corrosion resistant and easy to maintain. Non-slip finishes can be produced. Job pictures show typical installations, and detailed directions are given for laying this type of flooring.

DUST & FUME CONTROL

Dust Collectors in Ceramic Industry . . . 14
American Wheelabrator & Equipment Corp. "The Use of Dustube Collectors in the Manufacture of Ceramics" is the name of a new 4-page illustrated bulletin. The report is presented in PROBLEM—SOLUTION—RESULT style, while the pictures show applications in salvaging enamel frit, ventilation of spray booths, control of dust from silica brick.

LINEMEN'S EQUIPMENT

Belts, Climbers and Accessories . . . 15
W. M. Bashlin Co. A 4-page bulletin describes and pictures the necessary safety equipment for linemen. Included, with prices, are safety belts, safety straps, climbers and pads, gaffs, tool bags, tool buckets, hoods, winter gloves, grips, etc.

TRAINING AIDS

Portable Movie Projector . . . 16
E. J. Barnes & Co., Inc. To get new life into safety and training meetings, why not utilize sound motion pictures? This 2-page folder pictures a self-contained projection unit and lists the many features of the product. The unit weighs 40 lbs. and forms a convenient suitcase size for transportation. It utilizes 16mm. film, either silent or sound, and has a magazine capacity of 800 ft.

Placement Tests . . . 17
Science Research Associates. The new 80-page catalog describes the various tests, learning aids, books and personnel materials available from this organization. Of particular interest to safety and personnel directors are tests of intelligence, interest, aptitude, and occupational proficiency. Although much of the other material is designed for the counseling of adolescents, personnel directors will find many aids to the correct and safe placement of employees.

RADIATION PROTECTION

Radioactivity Instruments . . . 18
Tracerlab, Inc. A new 98-page catalog has been issued by one of the country's leading manufacturers of atomic-age equipment. The illustrated catalog gives complete details on the instruments, equipment and devices available commercially from its laboratories, including: scalers, survey meters, monitors, Geiger-Mueller tubes, film badges, remote handling devices, shielding equipment, dosage meters, industrial instruments, and tagged chemicals.

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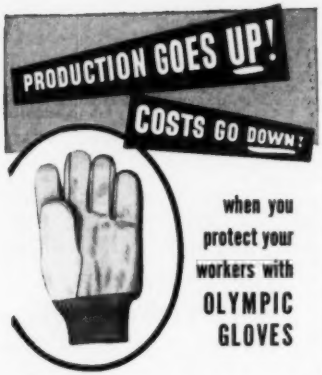

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This plain canvas glove (#1800) is "Olymized", a process which makes gloves so treated outlast ordinary untreated gloves by as many times as 3 to 1 or 9 to 1, depending on the job. Will not peel or crack, non-slippery, non-toxic. Washable; retains its softness and flexibility. Also made with long and short cuffs. Remember . . . Olympic has a glove to fit every job!

FREE *Illustrated Catalog of Safety Work Gloves, Finger Protectors and Safety Apparel Sent to Business Organizations on Request.*

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GC-3 . . . 7¾" x 7¼"—A beautiful two-tone jewelers bronze etching with "Green Cross for Safety" in color, mounted on a genuine walnut shield, only $6.50.

Engraving @ 6¢ per letter.

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CAUTION PASSAGE TO THIS FIREHOSE MUST BE KEPT CLEAR
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For throat irritations 'Thantis'* Lozenges provide effective relief. 'Thantis' Lozenges are especially beneficial in soothing these conditions because they are both antiseptic and anesthetic for mucous membranes of the throat and mouth. These effects are due to the two active medicinal agents, 'Merodicein'* an antiseptic of low toxicity, and Saligenin, a mild local anesthetic. When 'Thantis' Lozenges are dissolved in the mouth, the two ingredients dissolve slowly, providing prolonged medication of the throat.

Each lozenge contains 'Merodicein' (H. W. & D. brand of monohydroxymercuridiiodoresorcinsulfonphthalein-sodium) 1/8 grain, Saligenin (orthohydroxybenzyl-alcohol, H. W. & D.) 1 grain.

Supplied in vials of 12 lozenges in individual cartons.

*Reg. U. S. Pat. Off.

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